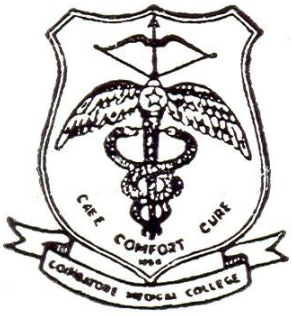
A CLINICAL STUDY

OF

PROPTOSIS – A CLINICAL

STUDY CONDUCTED IN

CMC



DISSERTATION

SUBMITTED TO

The Tamilnadu Dr. M.G.R. Medical University

In partial fulfillment of the regulations for the

M.S. Degree Examination in Ophthalmology

March 2007

CERTIFICATE

I hereby certify that this dissertation entitled "Proptosis – A clinical Study conducted in CMC is a bonafide work by **Dr. S. Amudhavadivu** during the period from June 2004 to September 2006 in Coimbatore Medical College, Coimbatore under my guidance and supervision. The conclusions reached in this study are her own. I have great pleasure in forwarding it to the Tamilnadu Dr. MGR Medical University.

Place : Coimbatore

Date :

Head of the Institution
Dean
Coimbatore Medical College
Hospital, Coimbatore – 641 018.

Head of the Department

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Dr. S. Amudha Vadivu

INDEX

INTRODUCTION

Proptosis or exophthalmos is defined as protrusion of the globe beyond he orbital margins, with the patient looking straight ahead. Proptosis often refers to unilateral displacement of an eye and exophthalmos to bilateral displacement[1]. Henderson[2] reserves the use of word exophthalmos for those cases of Proptosis secondary to endocrinological function.

Proptosis is the common presenting symptom of wide variety of diseases affecting the structure present in and around the orbit. The orbits are a pair of bony cavities of the skull situated on either side. The fact that the orbit is in intimate relationship with the cranial cavity, the nose the paranasal sinuses around it makes it vulnerable to many disorders that might involve the orbit.

A lesion in the intraconal region produces axial Proptosis and lesions in the extraconal region produces eccentric Proptosis.

In adult males, the average distance of globe protrusion is 21 mm. A difference of more than 2 mm between the two eyes of any given patient is considered abnormal[3]. The etiological basis of Proptosis can be inflammatory, vascular and infectious. In adults, thyroid orbitopathy is the most common cause of unilateral and bilateral exophthalmos[4]. Proptosis occurs in both adults and children at any age. Proptosis due to any cause can compromise visual function

and integrity of the eye. The symptoms and signs of Proptosis are manifested by displacement of the globe and are associated with local pain, redness and swelling. It is often accompanied by decreased vision, double vision, optic disc swelling and impaired ocular movements[5]. Early diagnosis and management is the key to address the issue.

The services of an ENT surgeon, Neuro surgeon and a physician is sought and a thorough systemic examination will complete the procedure. A conclusion can be arrived clinically noting the age of the patient, duration and presentation of Proptosis, direction of Proptosis, associated signs and symptoms and also by excluding certain diseases by the absence of their typical presentations. A final diagnosis may be possible in many cases only after the laboratory investigations like peripheral smear and radiological investigations like X Ray, USG, CT Scan and MRI.

CLASSIFICATION OF PROPTOSIS

Classification of Proptosis depends upon the aetiolgy, age of onset, laterality, onset, nature (pulsation intermittency, etc.) and pathological types.

Conditions that can produce congenital Proptosis :

(Congenital and development anomalies)

- Dysostosis of cranial bones
- Craniostenosis
- Hypertelorism
- Infantile Glaucoma
- Axial High Myopia
- Encephalocele
- Meningocele
- Colobomatus cyst
- Dermoid cyst
- Teratoma
- Lymphanogioma
- Varix
- Capillary Hemangioma
- Neurofibroma
- Ectopic lacrimal gland
- A-V Malformation
- Optic Glioma
- Rhabdomyosarcoma
- Fibrosarcoma
- Neuroblastoma
- Rehinoblastoma
- Juvenile xanthogranuloma
- Traumatic hematoma

INFLAMMATORY AND INFECTIOUS

- Orbital cellulitis
- Tenonitis
- Orbital myositis
- Orbital thrombophelebitis
- Sinus mucocele and sinusitis
- Dacryoadenitis
- Subperiosteal orbital abscess
- Osteomyelitis
- Cavernous sinus thrombosis
- Idiopathic pseudotumour
- Echinococcal cyst
- Specific inflammatory granuloma (like TB, Syphilis, Sarcoidosis, mycotic,parasitic, FB, ruptures dermoid cyst, etc.)

Traumatic

- Birth injuries
- Orbital Heamatoma
- Orbital Emphysema
- Blood cyst
- Retained foreign body
- Traumatic aneurysm
- Carotid cavernous fistula
- Encephalocele
- Post traumatic granuloma

Endocrine metabolic and disease involving bone :

- Grave’s disease, myxoedema
- Acromegaly
- Osteopetrosis

- Rickets
- Infantile cortical hyperostosis
- Histocytosis – X
    - Eosinophilic Granuloma
    - Hand Schuller Christian disease
    - Letterer – Siwe disease
- Fibrous dysplasia

Vascular

- Cavernouse hemangioma
- Lymphangioma
- Stuge-Weber syndrome
- Carotid – Cavernous fistula
- Aneurysm of ophthalmic artery
- Orbital varix
- Cirsoid aneurysm of the orbit
- Capillary haemangioma

Neoplastic

Benign

- Dermoid
- Epidermoid
- Teratoma
- Haemangioma and Lymphangioma
- Neurofibroma
- Fibroma, lipoma
- Rhabdomyoma
- Osteoma, chondroma
- Neurilemmoma
- Meningioma

- Optic nerve glioma
- Eosinophilic granuloma
- Fibrous dysplasia
- Ossifying fibroma
- Juvenile fibromatosis
- Lacrimal gland tumor

Malignant (Primary and Metastic)

- Rhabdomyosarcoma
- Fibrosarcoma, liposarcoma
- Angiosarcoma
- juvenile angifibroma of nasophaynx
- Osteosarcoma, Chondrosarcoma
- Neurofibrosarcoma
- Meastatic neuroblastoma
- Extra ocular Retinoblastoma
- Leukemic infiltration (chloroma)
- Lymphoma (Burkitt's Lymphoma)
- Malignant melanoma
- Ewing sarcoma, Wilms tumour
- Malignant histiocytosis
- Intracranial tumour involving orbit
- Ovarian Sarcoma, sarcoma of ethmoids
- Lacrimal gland tumour
- Nasophryngeal Carcinoma

Miscellaneous

- Laxity o facial supports of the globe and orbicularis
- Edema of systemic origin
- Paralytic proptosis III nerve
- Unknown

Intermittent Proptosis

- Orbital varices (90% of cases)
- Vascular Orbital Neoplam – eg. Haemangioma, Lymphangioma
- Recurrent Orbital hemorrhage
- Venous congestion
- Periodic orbital edema
- Intermittent ethmoiditis and otitis media
- Recurrent emphysema of the orbit

Pulsating Proptosis

Vascular pulsation

- Carotico – cavernous fistula
- Saccular aneurysm – Opthalmic artery, Carotid artery, Cirsoid aneurysm of the orbit
- Orbital varix
- Cavernous sinus thrombosis
- Vascular tumours

Cerebral pulsation

- Meningocele
- Encephalocele
- Neurofibromatosis
- Traumatic or operative hiatus in the orbital roof
- Erosion of orbital wall – Neoplasm of cyst

Based on Laterality

Unilateral Proptosis

- Orbital cellulities

- Paranasal sinus infection
- Pseudotumour
- Parsific cyst
- Dermoid cyst, Teratoma
- Lymphangioma
- Haemangioma
- Orbital varices
- Retrobular haemorrhage
- Optic nerve glioma
- Retinoblastoma-orbitl extension
- Rhabdomysarcoma

Bilateral Proptosis

- Craniosynostosis, crouzon's disease
- Meningoencephalocele
- Microphthalmos with cyst
- Neurolastoma, optic nerve glioma
- Burkitt's Lymphoma
- Leukemia
- Cavernous sinus thrombosis
- Endocrine exophthalmos

Psuedo Proptosis

- Globe is enlarged

  - Congenital Bupthalmos, cystic eyeball
  - High axial mylopia
  - Staphyloma

- Lids are retracted
    - Congenital deformity- microblepharan
    - Dermoatoses or from scarring
    - Sympathetic irritation
    - Grave’s disease
    - Parkinsonism
- Lower lid sags in facial palsy or retracted by recession of inferior rectus
- Deformation of orbit in facial asymmetry

ANATOMY OF THE BONY ORBIT

The eyes lie in two bony cavities of the skull situated on either side of the roof of the nose, the orbits Fossae orbitales. The orbit resembles a quadrilateral pyramid with its base directed forwards outwards and slightly downwards[24].

Posteriorly the cavity narrows to an apex of a triangular pyramid wherein the optic nerve and the muscles lie. The change in configuration from a quadrangular to a triangular pyramid is due t the failure of the floor of the orbit, to reach the apex.

EMBRYOLOGY OF THE ORBIT

The bony walls of the orbit are formed from the mesoderm surrounding the developing eye. The floor and lateral wall of the orbit are derived from the visceral mesoderm of the maxillary process, the roof is developed in the paraxial mesoderm forming part of the capsule covering the forebrain; while the medial wall is developed from the lateral nasal process[22].

All the orbital contents, its muscles, fascia and vessels as well as the mesodermal stoma of the globe are developed from the paraxial mesoderm. Ossification centres for orbital bones appear between the 6^{th} and 7^{th} week of embryonic life.

ORBITAL WALLS

The orbital walls are composed of seven bones.

1. Ethmoid
2. Frontal
3. Lacrimal
4. Maxillary

5. Palatine
6. Sphenoid
7. Zygomatic

THE ROOF (Vault of the Orbit)

It is approximately triangular in shape with the base placed anteriorly. It faces downwards and slightly forwards with concave anteriorly and flatter posteriorly. The roof is formed largely by the triangular orbital plate of the frontal bone, and behind this by the lesser wing of the sphenoid.

The fossa for the lacrimal gland lies in the anterolateral aspect of the roof. It contains not only the lacrimal gland but orbital fat, principally at its posterior (accessor fosa of Rochon-duvingneaud. Trochalear fossa situated in the anteromedial aspect of the roof above the frontolacrimal suture, 4 mm behind the orbital margin. The fibrous pulley of superior oblique is attached to the fossa.

The frontosphenoidal suture is usually obliterated in the adult, this suture lies between the orbital plate of the frontal bone and the lesser wing of the sphenoid. The orbital aspect of the roof is marked by small apertures and are marked in infants and children. The openings in the anterior part near the trochlear fossa transmit diploic veins. The foramina in and around lesser wing of sphenoid transmit vessels connecting dural veins and ophthalmic veins.

RELATIONS

The frontal nerve is in contact with the periorbita along the whole roof. The supraorbital artery accompanies only in the anterior half. Inferior to both are levator palpebrae and the superior rectus. The trochlear nerve lies medially, in contact with the perorbita.

The lacrimal gland adjoins the lacrimal fossa and the superior oblique the junction of roof and medial wall. Invading the roof to a variable tent are the frontal and ethmoidal sinuses. Above the roof are the frontal lobe of the cerebrum and its meninges.

THE MEDIAL WALL

The oblong medial wall is the thinnest (0.2 to 0.4 mm) orbital wall and it is formed by four bones.

1. The fronal process of the maxilla
2. The lacrimal bone
3. The orbital plate of ethmoid
4. A small lateral aspect of the body of the sphenoid.

Anteriorly is the lacrimal fossa, formed by the frontal process of the maxilla and the lacrimal bone. It is bounded by the anterior and posterior lacrimal crests. About 20 mm behind the anterior medial orbital margin is the anterior ethmoid foramen, and 12 mm behind this, the posterior ethmoid foraman, which is 5-8 mm from the optic canal.

RELATIONS

Medially the lateral nasal wall, infundiulum, ethmoidal sinuses and sphenoidal air sinus. The optic foramen is located at the posterior end of the medial wall.

The superior oblique muscle is in the angle between roof and medial wall.

FLOOR OF THE ORBIT

The infraorbital canal descends in the orbital floor to open at the infraorbital foramen about 4 mm below the orbital margin. Posteriorly the lateral wall is separated from the floor by inferior orbital fissure (sphenomaxiallary fissure). The floor is traversed by the infraorbital sulcus which runs forwards from the inferior orbital fissure.

RELATIONS

Below most of the floor of the orbit is the maxillary sinus. The inferior rectus adjoins the floor near the apex of the orbit, but it is separated from it anteriorly by the inferior oblique muscle and fat. At the lateral edge of the inferior rectus, or between it and the lateral rectus, is the nerve to inferior oblique.

The inferior oblique arises at the lateral edge of the opening of the nasolacrimal canal and passes posterolaterally and up near the floor. The infraorbital vessels and nerve occupy their sulcus canal.

INFERIOR ORBITAL FISSURE

It is situated at the junction of the lateral wall and floor. It is gap bounded by maxilla and orbital process of palatine bone anteromedially and greater wing of the sphenoid posterolaterally and called the Spheno-Maxillary fissure. The inferior ophthalmic vein passes through its lower portion before entering the cavernous sinus.

LATERAL WALL OF THE ORBIT

The lateral wall is the thickest among the four walls. It is triangular in shape with the base of the triangle placed anteriorly. It inwards, forwards and

slightly upwards and forms an angle of about 450 with the median sagital plane. The lateral wall of the orbit s formed by two bones (i) Anteriorly by the orbital surface of the Zygomatic bone (ii) posteriorly by the orbital surface of the greater wing of the sphenoid.

The lateral orbital tubercle (Whitnall) is a small elevation on the orbital surface of the Zygomatic bone behind the lateral orbital margin and about 1 mm below the frontozygomatic suture. It gives attachment t (i) The check ligament of the lateral rectus muscle (ii) The suspensory ligament of the eye ball (iii) The aponeurosis of the levator palpebrae superiors (iv) The lateral palpebral ligament.

RELATIONS

The lateral wall separates the orbit anteriorly from the temporal fossa and muscle, posteriorly from the middle cranial fossa and temporal lobe of the cranium.

The lateral rectus muscle is in contact with the whole of this wall, with the lacrimal nerve and artery above it. The inferior pole of the lacrimal gland reaches the lateral wall, where the lacrimal nerve receives a parasympathetic branch from the zygomatic, which with its vessels, also adjoins the wall.

SUPERIOR ORBITAL FISSURE (SPHENOIDAL FISSURE)

This connects the orbit and the middle cranial fossa and it is situated at the junction of the roof and the lateral wall. This is a gap between the lesser and greater wings of the sphenoid. It measures 22 mms in length. The fissure is wide medially and narrow laterally (retort or comma shaped). The common tendinous ring of Zinn divides the fissure in to three parts. (i) The part above the lateral to the ring transmits lacrimal, frontal, trochlear nerves and superior ophthalmic vein

and occasionally, an arterial anastomosis between branches of middle meningeal artery and lacrimal artery. (ii) The intermediate part is called oculomotor foramen, it transmits superior division of oculomotor nerve, nasociliary, sympathetic twig to ciliary ganglion. (iii) The part below and medial to the ring transmits the inferior ophthalmic vein.

THE RELATIONS OF THE ORBIT

Superiorly	_	Anterior cranial fossa
	_	Frontal Sinus
	_	Supra orbital sinuses
Inferiorly	_	Maxillary antrum
	_	Palatine air cell
Medially	_	Ethmoid cells, Nasal cavity, Sphenoid Sinus
	_	(Posteriorly)
Laterally	_	Middle cranial fossa, Temporal fossa, Pterygopaltine fossa.

THE ORBITAL CONTENTS

While the globe of the eye occupies most of the space of the anterior segment of the orbit, the greater part of its posterior segment occupied by orbital fat and the functionally important tissues like muscles, blood vessels and nerves occupy a comparatively small volume.

1. The muscles

i. Extrinsic muscles of the eye ball

- Recti : lateral, medial, superior and inferior

- Obliques : superior and inferior

ii. Muscles of the lids, levator palperbrae superiors
iii. Plain muscles of the orbit
    - Orbital muscle (of muller)
    - Periorbital muscle

2. The orbital Fascia

The orbital fascia comprises

i. The fascia bulbi (Tenons capsule / Tunica Vaginalis occuli)
ii. The fascial sheaths of the muscles
iii. The check ligaments of the muscles
iv. The connective tissue supporting the orbital fat
v. The periorbital membrane (periosteum which lines the orbital cavity)
vi. The orbital septum.

3. Surgical Spaces

There are four surgical spaces

i. The Episcleral (Tenon's) space – lying between the Tenon's capsule and the globe.
ii. The central surgical space – lies within the muscle cone
iii. The peripheral surgical space – line between the partition formed by the muscles and the intermuscular membrane internally and the periosteum eternally.

iv. The subperiosteal space – potential space between the periosteum and the bone.

4. Blood vessels of the orbit

i. Arterial circulation

- Internal Carodid artery – gives off the ophthalmic artery
- External Carotid artery
    - A. Internal maxillary artery through the infraorbital artery
    - B. Middle meningeal artery through the orbital branch

ii. Venous Circulation

There are three main veins with in the orbit

(i) Superior ophthalmic vein

(ii) Inferior ophthalmic vein

(iii) Central retinal vein.

The superior ophthalmic vein is formed by union of the supra orbital and angular vein of the face. It receives branches from large ethmoid branches, from the face, two superior vortex veins and the lacrimal vein. The inferior ophthalmic vein begins as a venous network on the orbital floor, receiving branches from the lower lid, the region of the lacrimal sac, the inferior rectus and inferior oblique muscles and the two inferior vortex veins.

iii. The Lymphatics

In the orbit there are no lymph nodes or lymphatic vessels have been demonstrated probably the main lymph drainage from the orbit accompanies the veins through the inferior orbital fissure to the internal maxillary nodes then to the superior deep cervical nodes.

5. Nerves of the Orbit

i. Optic nerve – the nerve of vision
ii. Cranial nerves III, IV, VI : Motor and parasympathetic fibres to the extra ocular muscles and the LPS and to the intra-ocular muscles
iii. 1^{st} and 2^{nd} division of cranial nerve V : Sensory to eye ball, the lacrimal gland, the conjunctiva, the lids and large areas of the surrounding skin of the face, as well as conveying parasympathetic fibres
iv. Sympathetic : To the eye ball, lacrimal gland, the orbital plain (and striated) muscle and vasomotor to the orbit.
v. Cranial nerve VII : Parasympathetic fibres essentially to the lacrimal gland.

6. Others

Lacrimal gland, lacrimal sac and orbital fat.

ORBITAL FISSURES, CANALS AND FORAMEN

S.No	Fissures /Canals / Foramen	Location	Contents
1	Superior orbital fissure	Lesser and greater wings of sphenoid	Nerves III Superior Inferior divisions IV and VI nerves Sympathetic fibres VI Frontal, Lacrimal and Nasociliary nerves Vessels – Superior and Inferior ophthalmic veins. Anastomosis between acromial and middle meningeal artery
2	Inferior orbital fissure	Greater wing of sphenoid, palatine, zygomatic and maxillary bones	Nerves Infraorbital and zygomatic nerves Branches from pterygo palatine ganglion Vessels Inferior ophthalmic vein branches to pterygoid plexus Infraorbital vessels
3	Optic Foramen	Lesser wing of sphenoid	Optic nerve, meninges ophthalmic artery and sympathetic fibres
4	Anteri Ethmoidal Canal	Frontal and ethmoid	Anterior ethmoidal nerve and artery
5	Posterior ethmoidal canal	Frontal and Ethmoid	Posterior ethmoidal nerve and artery

WORK UP OF AN ADULT WITH PROPTOSIS

A detailed history (General, ocular, medical, surgical, personal and family) is elicited.

Ocular examinations (including visual acuity, anterior, posterior segment of the eye, ocular motility, exophthalmometry, IOP, fields, retinoscopy and forced duction test) and other relevant systems examination are done. In relevant cases, other departments like E.N.T., Neurology, Endocrionology, Radiology, Oncology, Pathology, Pediatrics and Orthopedics opinions are obtained. To obtain final diagnosis and management following investigation have been done.

- Laboratory
- Ultrasound
- Radiological like X-rays, CT scan and MRI
- Biopsy and Histopathological examination.

VISUAL ACUITY

Exopthalmometry (Proptometry)

Exopthalmometers are used to measure the proptosis, generally it measures the distance from outer orbital margin to the corneal apex, while the eyes look straight.

- Normal values – 10-20 mm
- Enophthalmos if the value is less than 10 to 12 mm
- Exophthalmos if the value is more than 21 mm or the difference of more than 2 mm.

TYPES OF EXOPHTALMOMETRY

- Absolute – The values are compared the normal values (10-20 mm).
- Comparative – The values are compared from time to time.
- Relative – As compared with other eye (The difference of more than 2 mm is important).

HERTEL'S EXOPHTHALMOMETER (1905)

It is the most commonly used exophthalmometer. This instrument is binocular and resting on each lateral bony orbital margin, allows an observer in front with the aid mirrors to view images of the eyes seen in profile (corneal apex), superimposed upon measuring 9 (in mm) scale. The measurement is the distance between the apex of the uncovered cornea to the temporal margin of the orbit.

INTRAOCULAR PRESSURE

Intraocular pressure is measured in both eyes, in both primary and in differential gaze, using the SCHIOTZ identification tonometer.

FORCED DUCTION TEST

It is performed by using instrument to move the anesthetized eye mechanically in to various positions, thus determining resistance to passive movements in restrictive pathology but not in paralytic cases.

LABORATORY INVESTIGATIONS

BLOOD : Total count, differential count, ESR, Hb%, red blood cell count (in some cases), peripheral smear, BT, CT and bone marrow study(if necessary), blood grouping, Rh typing, serum T3, T4 and TSH (if necessary).

URINE : Albumin, sugar and deposits

MOTION : Ova and cyst.

RADIOLOGICAL INVESTIGATIONS

Plain X-Ray – Orbit, Optic canal, Sinuses and skull.

IMPORTANT RADIOLOGICAL VIEWS

Caldwell's view : In this view, patient's forehead and nose touch the plate with incident ray angled at 10^{0} downwards. This view allows good visualization of orbital margins, medial wall, lesser wing of the sphenoid, superior orbital fissure, orbital, portion of zygoma. The innominate line is prominent in this view and is discontinuity indicates lateral orbital wall fracture. It provides excellent view of frontal and ethmoid sinuses.

Water's view : Patient nose and chin touch the plate in this view. This view provides the best image of the maxillary antrum and good images of the orbital rim, floor, lesser wing of the sphenoid and infra orbital foramen.

Rhese's view (optic canal) : It allows good visualization of the optic canal, medial wall, lacrimal fossa and orbita apex.

Lateral's view : The orbital roof is the best evaluated in this view, all paranasal sinuses can be evaluated by this view. It also shows the sella turcica, anterior and posterior clinoid processes, nasopharynyx and cribriform plate.

Basal's view : This view allows good visualization of posterolateral wall of the orbit, maxillary sinus, greater wing of sphenoid and pterygoid fossa. History of neck injury is a contraindication to this view.

RADIOGRAPHIC CHANGES IN ORBITAL PATHOLOGY

- **Enlargement of the orbit :** Localized enlargement in space occupying lesion outside the muscle cone and long standing neoplasms (lacrimal gland lesion is common). Generalized enlargement in long standing space occupying lesion causing increased intra orbital pressure. Downward bowing of the thin floor of the orbit below the infra orbital margin is the earliest sign. Concentric enlargement with out bony destruction seen in Hemangioma and Lymphangioma. Symmetric enlargement in case of tumor with in the muscle cone.

- **Diminution of orbital size :** It is seen in craniostenosis and the therapeutic irradiation.

- **Hyperosteosis :** The most common for hyperostosis is meningioma of the sphenoid bone. Fibrous dyplaia, Leontiasis osses, Paget's diseases, chronic periostitis, malignant tumours of the lacrimal gland and osteoblastic metastasis also produce hyperostosis.

- **Calcification :** It can be seen in retinoblastoma, meningioma, cavernous hemangioma and orbital varices. Plexiform

neurofibromatosis, tuberclosis, cyticercosis and hydatid disease also produce calcification.

- **Enlargement of sphenoid fissures :** Infraclinoid aneurysm, meningioma, caratico-cavernous fistula, extrasellar extention of pituitary tumour or chodoma can produce enlargement of sphenoid fissure. Intracranial extension of orbital space occupying lesion such as neurofibroma, reticulosis or pseudo tumour extending backward in to the middle cranial fossa.

- **Enlargement of optic foramen :** Normal adult dimension (4-6 mm) being reached by the age of 4- years. Measurement of more than 7 mm is abnormal. Uniform enlargement is seen in glioma of the optic nerve and extension of orbital neurofibroma or retinoblastoma asymmetrical erosion of inferolateral margin is seen in infraclinoid aneurysm and meningioma. Erosion of upper margin is characteristic of raised intra cranial pressure.

- **Narrowing of Optic foramen :** Seen in fibrous dysplasia, Paget's disease, hyperostosis secondary to to a meningioma, idiopathic hypercalcmia and microophthalmos.

- **Soft tissue and orbital emphysema :** Clouding of paranasal sinuses may be due to infection or neoplastic disease. The orbital emphysema may be seen in medial wall and floor fractures.

ULTRASONOGRAPHY

Baum and Green wood in 1960 first used the ultrasound in orbital lesions. The safety and relative low cost of ultra sound on comparison to CT Scan and MRI gives it a distinct and practical advantage that will maintain its value in

detecting orbital mass lesions. It is a dynamic test where diagnosis is best reached during examination and not from still pictures. There are three modes of echo display used in ophthalmic ultrasound.

- A Sound – It is a time amplitude study. Primarily used for measuring the axial length and power of IOC.
- B Mode – Gives real time two dimensional image of the eye.
- M Mode – Usually 5 or 10 MHz transducer are nest for orbital diagnosis.

Low reflectivity : Organizing hematoma in peripheral space. Mucocele, varix, benign mixed tumour, lymphoma, inflammatory tumour rhabdomyosarcoma, neurilemmoma, fibrous histiocytoma and capillary hemangioma (variable) .

Medium reflectivity : Dermoid, optic nerve glioma and mengioma.

High reflectivity : Cavernous hemangioma, lymphangioma, most carcinomas and vascular neoplasm.

Advantages of Ultrasonography :

- It is not invasive and no exposure to radiation
- Assess kinetic properties of orbital lesions
- Performed as an OP procedure
- Can be performed by an ophthalmologist and ideal for follow-up of lesion.

Disadvantages :

- Lesion in the posterior aspect of the orbit may not be picked up reliability.

ORBITAL COLOUR DOPPLER

It uses B mode coupled with Doppler technology to visualize flow in the vessels of the orbit. Useful in cavernous sinus fistula, orbital varices, A-V malformation and superior ophthalmic vein obstruction.

COMPUTED TOMOGRAPHY (CT SCAN)

CT scanning is the most valuable technique for delineating the shape, location, extent and character of lesions in the orbit. CT scan not only helps to refine the differential diagnosis but also it guides the selection of the surgical approach by relating the lesion to the surgical space or spaces of the orbit.

Generally slice width for orbital CT scanning is 3 mm (for both axial and coronal). Current CT scanners administers a dose of radiation of approximately 1-2 cGy per orbit scan.

CT scan has resolution and tissue contrast capabilities allowing imaging of soft tissue, bones, contrast-containing blood vessels, and foreign bodies. Coronal CT scanning is especially useful in evaluating orbital floor and extra ocular muscle size in Grave's ophthalmpathy. Axial slices are parallel to Reid's baseline (from external auditory meatus to inferior orbital rim).

The spiral CT scanning technique, using new imaging hardware and software technique moves the scanner in a spiral fashion around the patient, generating data set.

Three dimensional CT scanning technique allows reformatting of CT information in to three dimensional projection of the bony orbital walls. Intra orbital contents cannot be visualized because of artifact.

Advantages of CT Scan :

- Simultaneous visualization of orbital soft tissues, bones, paranasal sinuses and cranium is extremely useful in locating and measuring the space occupying lesions.

Disadvantage of CT Scan :

- Inability to distinguish different pathological soft tissue masses which are radiologically isodense. Exposes the patient to ionizing radiation. It is expensive.

Comparison of CT Scan and MRI in orbital lesions

CT Scan	MRI
Good for most orbital conditions, especially fractures and Grave's Ophthalmopathy	Better for orbitocranial junction or intracranial problems
Good view of bone and calcium	No view of bone or calcium
Degraded image or orbital apex because of bony artifact	Good view of orbital apex unimpeded by bony artifacts
Less soft tissue detail	More soft tissue detail
Reformatting or rescanning required to image multiple planes	Multiple planes can be imaged at once
Contrast improves imaging in many cases	Contrast improves imaging in many cases
Less motion artifact because of shorter scanning time	More motion artifact because of longer scanning time
Less claustrophobic	Difficult for claustrophobic patient
Good for metallic foreign bodies	Contraindicated for patients with ferromagnetic metallic foreign bodies aneurysm clips and pacemakers
Less expensive	More expensive

MAGNETIC RESONANCE IMAGING (MRI)

MRI has revolutionalised the radiological imaging technique especially I soft tissue lesions. It is a noninvasive imaging technique that does not employ ionizing radiation and has no known adverse biological effects.

MRI is based upon the interaction of three physical components in (i) atomic nuclei possessing an electrical change (ii) radio frequency (RF) waves (iii) powerful magnetic field.

Angiography using MRI (MRA) can be done on diagnosis of vascular lesions like ophthalmic artery aneurysm, AV malformation and vascular tumors. Use of surface cells increase the spatial definition of the images.

Advantages and disadvantages of MRI :

Advantages	Disadvantages
No radiation	Patient motion artifact
No patient positioning	Poor spatial resolution
Direct multi planar views	It does not image bone and calcification
Superior soft tissue contrast	Prolonged examination time
Lack of bone artifact	Limited patient selection
Superior CNS imaging	Higher cost
Differentiates clotted blood from inflammatory lesions	
Less image degeneration	

Contraindication to MRI :

Suspected magnetic intraocular or intraorbital Fb, metallic surgical clips, cardiac pace makers and pregnancy.

INVASIVE TECHNIQUES

Other invasive given below are also available :

- Orbital Angiography
- Orbital Venography
- Radioactive isotope scanning
- Radio isotope arteriography
- Orbital biopsy
- Fine needle aspiration cytology (FNAC)
- Incisional biopsy
- Excisional biopsy

AIM OF THE STUDY

To study in detail,

1. Incidence of Proptosis among the general ophthalmic cases.
2. Aetiolgies of Proptosis in various age groups.
3. Most common cause of Proptosis.
4. Modalities of investigations and their role in diagnosis and treatment.
5. The best treatment options available and their respective out comes.

REVIEW OF LITERATURE

SIR STEWART DUKE ELDER – Says that, Proptosis is a passive protrusion of the globe from the socket[21].

VON GRAEFE in 1868[21] – first stressed the importance of digital evaluation of the compressibility of the orbit.

EXOPHTHALMOMETRY

1868-67 In **CHOH** made his first serious attempt to measure the proptosis from the outer orbital rim to the corneal apex[21].

1869 **Volkman** measured the proptosis with outer orbital rim and superior orbital rim as a base.

1870 **EMMERT** measured the proptosis with outer orbital rim and superior orbital rim as a base.

1870 In **ZEHENDER** used a mirror to measure the proptosis.

1905 **HERTEL**– measure the distance between the lateral orbital margin to the corneal apex in millimeter.

1900 **BIRTH –** Observation of photographic records.

1938 **Luedde** – used thick transparent scale.

1907 **HRCHFIELD –** Observation of photographic records.

1942 Stercophotographic methods of Exophthalmometry by **LOBECK**

1967 Radiographic Exophthalmometry by Silva and Ruiz

1967 Topometer of Watson in– to measure the non –axial proptosis. Orbitotonometer of COPPER – to assess the compressibility of the orbital contents.

Ultrasonography :

1956 **MUNDT AND HUGHES** in first described the ophthalmic application of ultrasound.

1958 **BAUM** and **GREENWOOD** B- Scan ultrasonography was first applied to ophthalmology

1960 B- Scan ultrasonography was first applied to ophthalmology **COLEMAN** and **WEININGER** introduced the M mode technique.

Computed Tomography :

1973 **GODEFREY HOUNSFIELD** developed the first practical technique of CT scan in and the award of the Nobel Prize for medicine recognized this achievement in 1979 [22].

Magnetic Resonance Imaging

1946 both **BLOCH** and **PURCELL** announced successful discoveries of NMR for which they were awarded Nobel Prize in 1952 [24].

MATERIALS AND METHODS

The study was conducted at Coimbatore Medical College Hospital(CMCH), Coimbatore between June 2004 and August 2006. Of which 50 patients presenting with Proptosis of the age ranging from eight (8) years to seventy (70) years were taken up for this study.

Patients Evaluation :

All patients were evaluated as follows. A detailed history of present and past illness was inquired. A thorough ocular examination was performed as follows :

Inclusion Criteria :

The patients who had proptosis both axial and eccentric, defective vision, nasal obstruction, Epistaxis, Extra ocular muscle movement restriction, Facial swelling, nasal mass, septal deviation, eye congestion, nasolacrimal sac pathology, lacrimal gland swelling were included and followed up.

Exclusion Criteria

Patients who had refractive error, cataract, papillitis, Corneal pathology glaucoma were excluded.

History of present illness included :

- Proptosis - age of onset
- Onset – sudden /gradual
- Duration – acute / chronic
- Rate of progression – slow / rapid
- Variability – with cough / posture / valsalva maneuver / sneezing
- Unilateral / Bilateral

- Defective vision / colour vision / field of vision
- Diplopia
- Redness / watering / irritation / photophobia, etc.
- Pain nature / severity / aggravating and relieving factor
- ENT symptoms (like ear discharge, nasal block, epistaxis, etc.)
- Fever / loss of weight
- Trauma
- Thyroid symptoms (like palpitations, tremor, intolerance to heat and cold, etc.)

Complete General Examination included :

- Anaemia , Jaundice,
- PR
- BP

Complete ocular examination included :

- Visual Acuity
- Orbit and eyelids
- Eyeball position
- EOM
- Proptosis
    - **Inspection.**
      Position – Axial / Eccentric
    - **Palpation**
      Compressibility
      Retropulsion
      Pulsation
      Valsalva maneuver

Insinuation of the fingers

- **Auscultation**

  Bruite

Evaluation of eyes using :

- Hertel's exopthalmometer
- S/L
- Direct and indirect opthalmoscopy
- Field charting , colour vision testing
- Tension recording
- Forced duction in different gazes
- Refraction

Examination of other systems involved :

- Ear, Nose,Throat (E.N.T)
- Thyroid
- Breast
- Abdomen
- Cardio Vascular System (CVS)
- Respiratory System (RS)
- Central Nervous System (CNS)
- Genito Urinary System

Investigations :

1. Haematology – HB
   - TC
   - DC
   - ESR

- Peripheral Smear
- Platelet count

2. Blood Sugar
3. Radiology
    - X Ray Orbit PA View and lateral view
    - X Ray skull
    - X Ray PNS
4. B Scan
5. Ultra sound abdomen
6. CT Brain
7. MRI
8. Other following opinions were obtained for appropriate cases
    - ENT
    - Dental
    - Gynaecology
    - Neurology
    - Endocrinology
    - Oncology
    - Pathology

ANALYSIS AND DISCUSSION

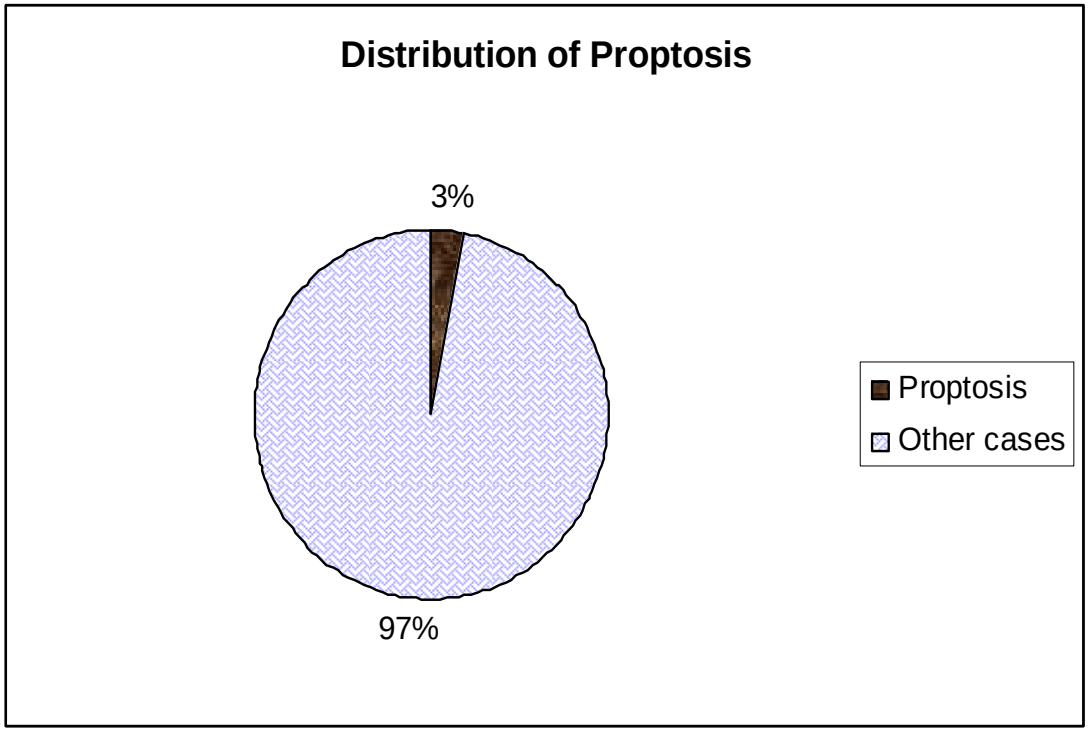
Incidence of Proptosis among the general ophthalmic cases that were treated between June 2004 – August 2006 at Coimbatore Medical College Hospital.

Distribution of Proptosis

Table No :1

General cases	Total Number of cases	Percentage
Proptosis	50	3%
Others*	1543	97%

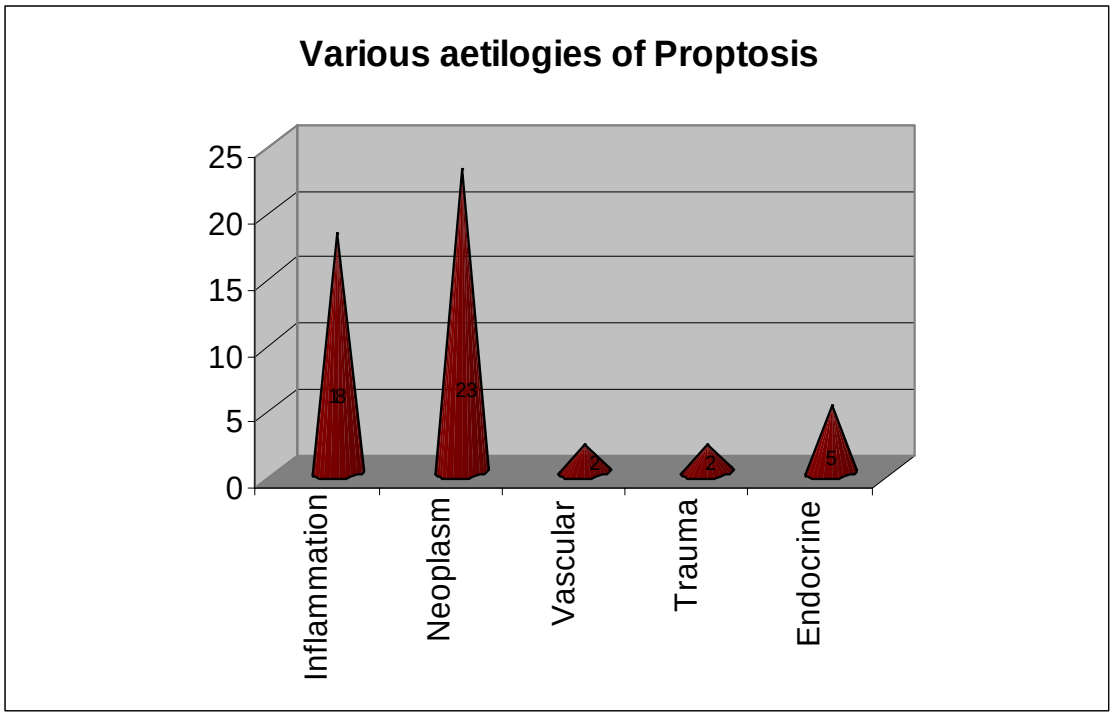
* Others include cases of lid pathology, corneal ulcers, naso lacrimal sac pathology and neuro ophthalmology.



Various Aetiologies of Proptosis

Table No : 2

Aetiology	Total Number of cases	Percentage
Inflammation	18	36%
Neoplasm	23	46%
Vascular	2	4%
Trauma	2	4%
Endocrine	5	10%

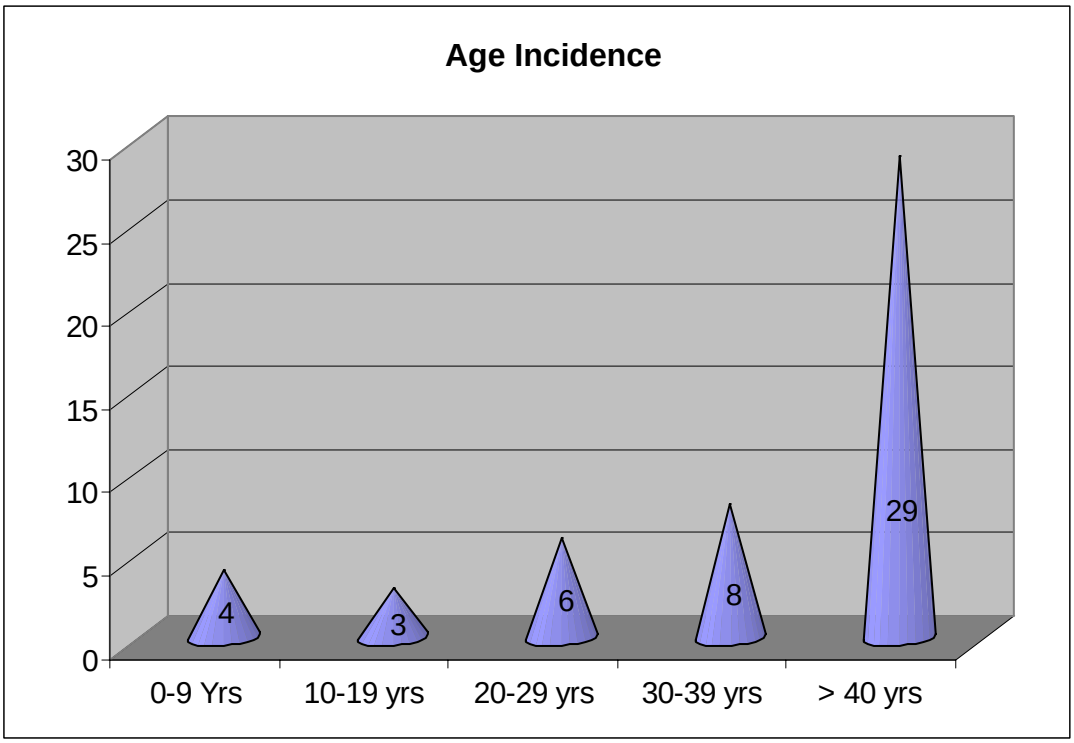


Neoplastic causes due to E.N.T followed by inflammation was the leading cause for Proptosis in the case studies.

Age Incidence

Table No : 3

Age in Years	Total Number of cases	Percentage
0-9 Yrs	4	8%
10-19 yrs	3	6%
20-29 yrs	6	12%
30-39 yrs	8	16%
> 40 yrs	29	58%

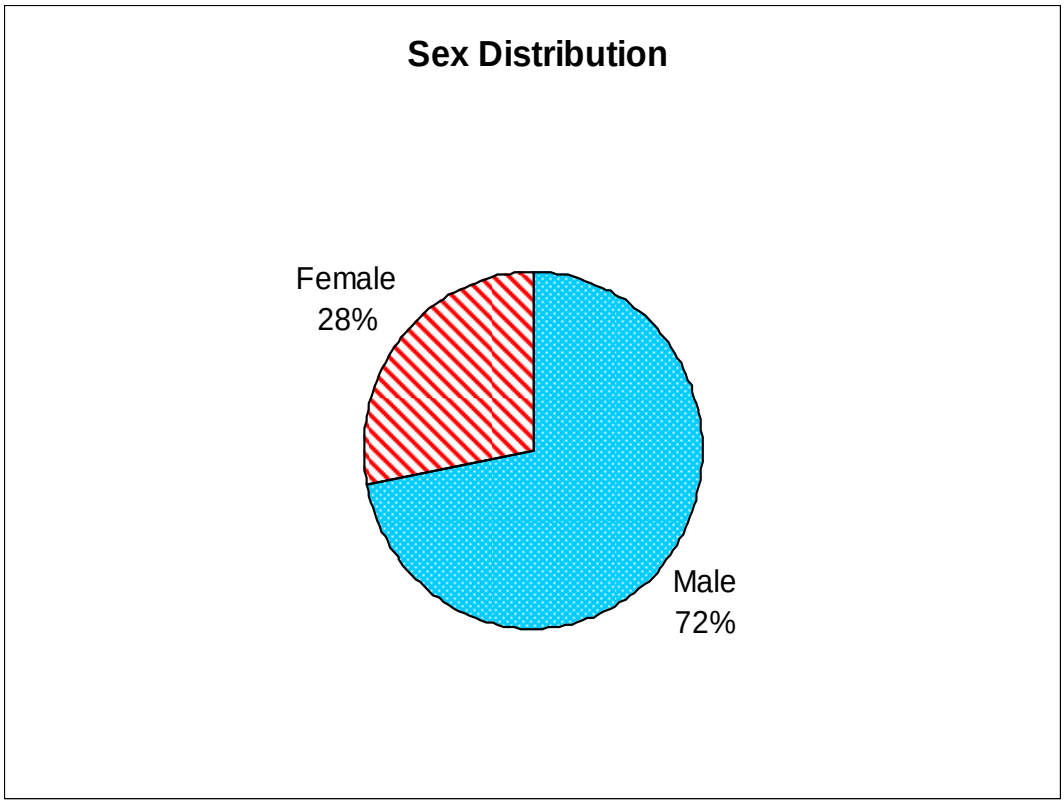


It was found that the maximum incidence is in the age group of above 40 years. The youngest patient was 6 years old and the oldest patient was 63 years old. The next affected age group was between 30-40 years. The overall frequency of malignancies in our series were 29% which is supported by seryard et al [8] who found 24% of malignant lesions in their study so the age incidence were maximum above 40.

Sex Distribution

Table No : 4

Sex	Total Number of cases	Percentage
Male	36	72
Female	14	28

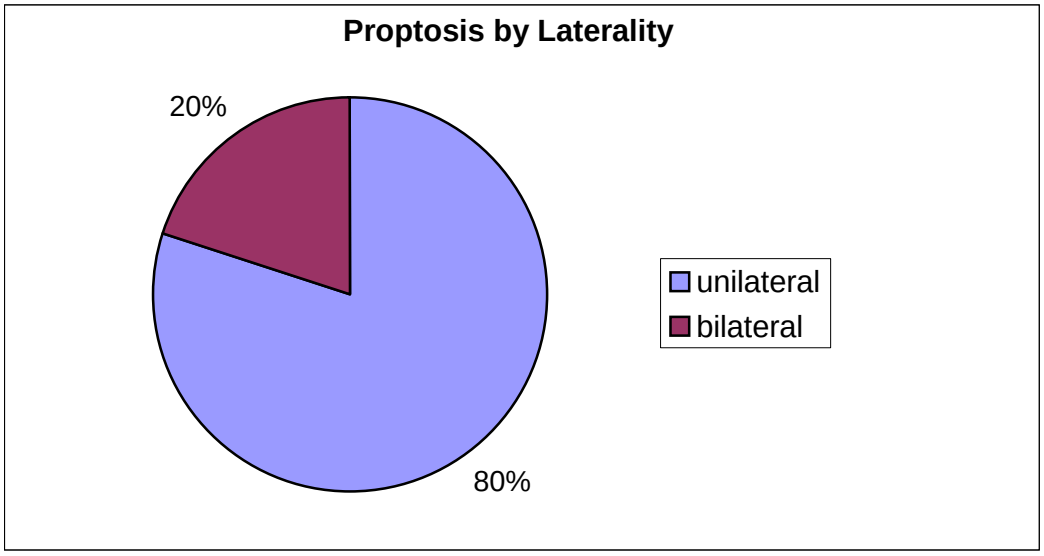


Of the total number of Proptosis cases studied, 72% patients were male and only 28% were females. This is comparable to a study carried by Asif and co-workers [7] who reported 70 % of male and 30 % of female patients in his study.

Laterality of Proptosis

Table No : 5

Latertality	Total Number of cases	Percentage
unilateral	40	80%
bilateral	10	20%

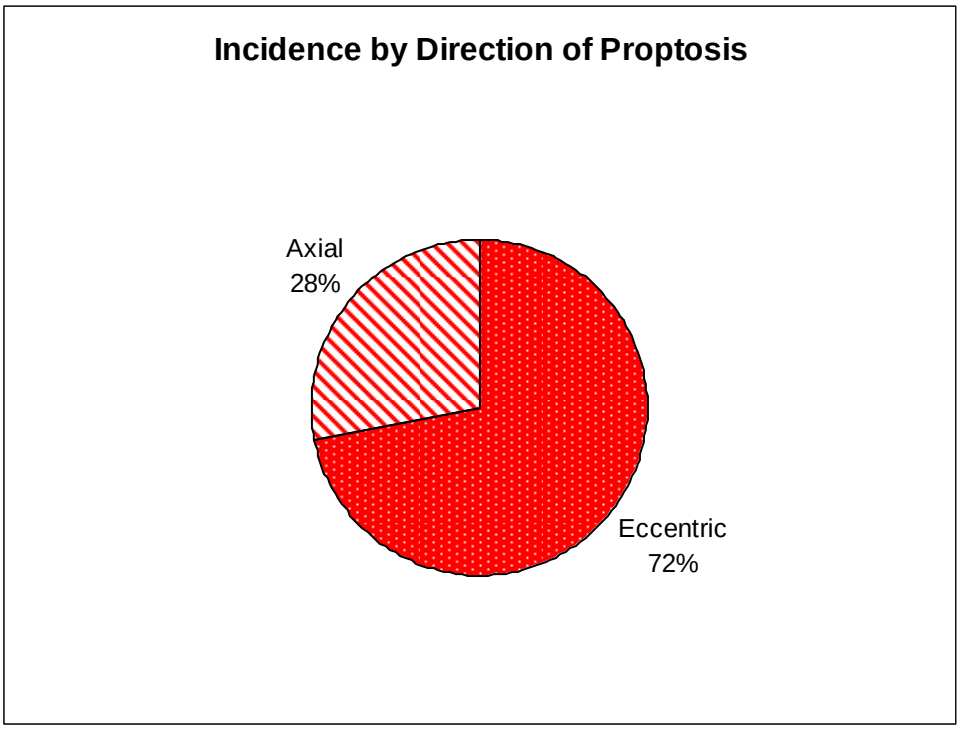


Of the total number of Proptosis cases studied, 80% patients were Unilateral and only 20% were Bilateral. Most of the patients in our study were having unilateral proptosis . This goes well with the study by kimbo et al [6] who reported unilateral proptosis in 92% of cases.

Direction of Proptosis

Table No : 6

Latertality	Total Number of cases	Percentage
Eccentric	36	72%
Axial	14	28%



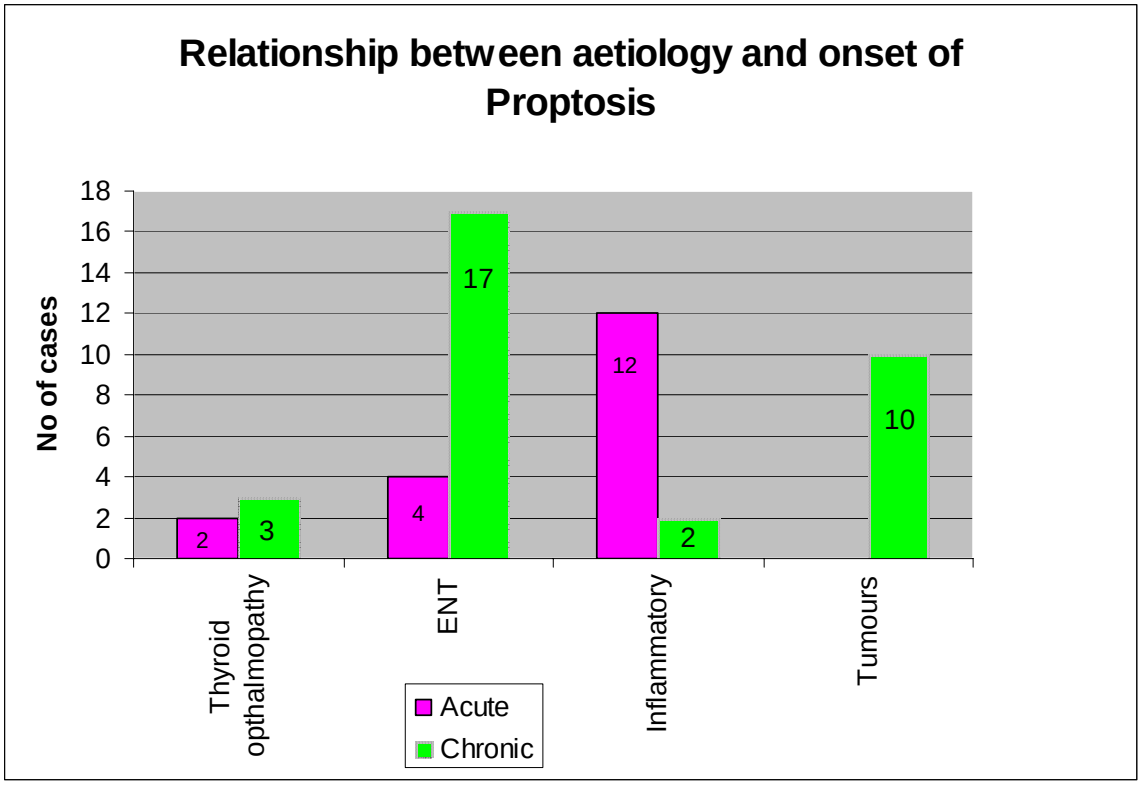
Eccentric Proptosis is more common than axial proptosis of the total 50 cases. 36 cases were Eccentric and only 14 cases were Axial Proptosis. Because of more number of E.N.T causes, eccentric proptosis was more common in this study. Root man[9] and Dallow reported most of the cases are due to Axial proptosis. This is because thyroid ophthalmopathy was a major cause of proptosis between 3rd and 6th decade.

CASE NO. 4
BILATERAL AXIAL PROPTOSIS

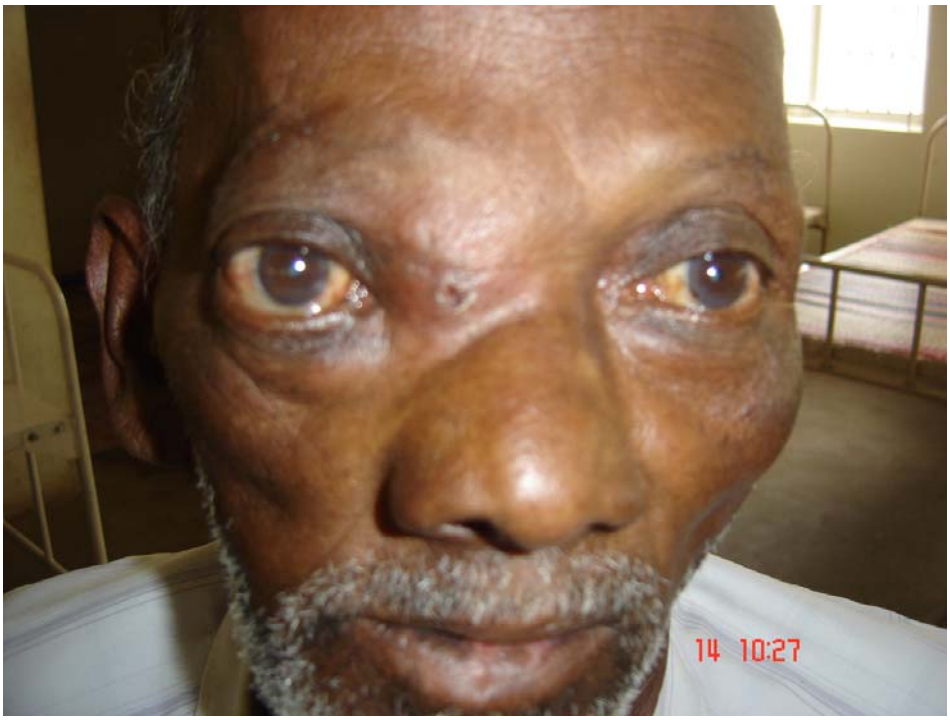
CASE NO. 19
ECCENTRIC PROPTOSIS

Relationship between Aetiology and onset of Proptosis and incidence

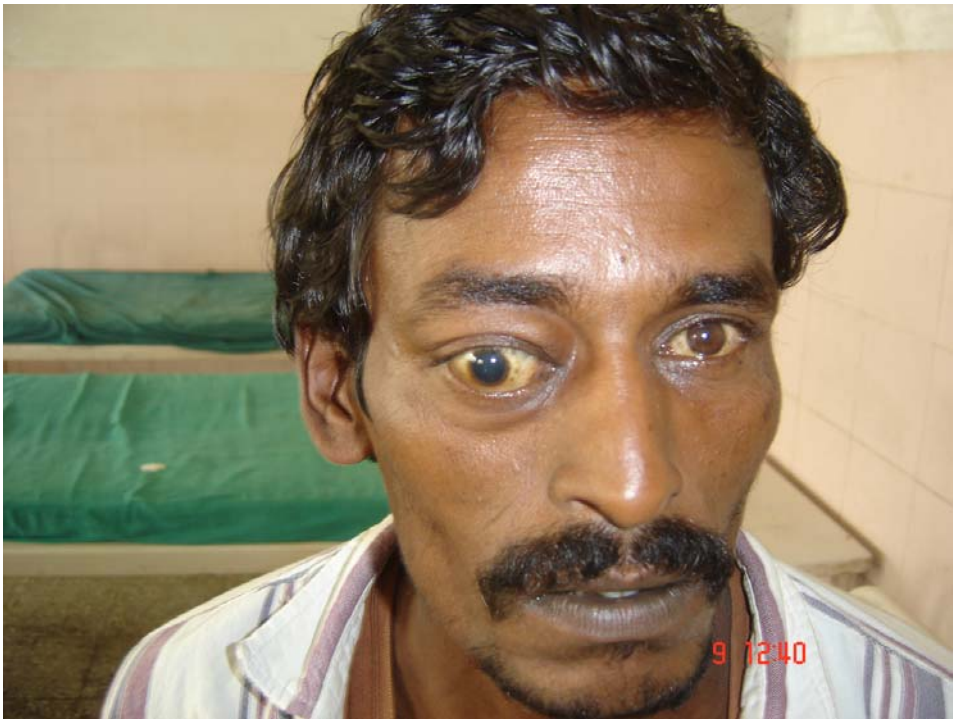
The E.N.T causes like pansinusites, mucocele, CA maxilla, nasopharyngeal carcinoma and rhinosporidiasis which constituted the maximum number of cases were usually gradual. Most of the thyroid exophthalmopathy was gradual in onset. Inflammatory causes were usually sub acute in origin.



Majority of patients had chronic onset of disease that occurred over a period of months, the two major categories were neoplastic and structural lesion along with some chronic inflammatory disorders. This is in agreement with Root man[9]. Who reported Chronic on set of disease in 60% of cases.



CASE NO. 38
FRONTAL PYOCELE



CASE NO. 10
PSEUDO TUMOR

ANALYSING THE INVESTIGATION PROCEDURES

Besides routine hematological investigations, radiological investigations like X Ray skull, PNS, orbit, USG of orbit, CT scan of PNS orbit and brain and biopsy for histropathology were done.

X-Ray

S.No	Signs	No of cases
1	Diffuse enlargement of orbital soft tissue shadows	4
2	Opticforaman enlargement	1
3	Erosion of orbital wall and osteolytic lesions	1
4	Haziness of sinuses	16
5	Calcification	1

The plain X Ray is a very useful tool in cases of Proptosis.

Enlargement of orbit is in any long standing intraconal mass lesion.

Enlargement of opticforamen > 7 mm on single side or a difference of more than > 1 mm between the two sides which is abnormal is seen in

1. Optic nerve glioma (uniform enlargement)
2. Neuro fibroma and Meningoma (irregular enlargement)
3. Increased intra cranial tension (upper margin widening)
4. Malignant lesion from PNS (total destruction of walls of sinuses)

CASE NO. 42
BEFORE TREATMENT - NHL

CASE NO. 42
AFTER TREATMENT - NHL

Soft tissue changes

1. **Cloudiness of PNS in**
    1. sinusitis
    2. Mucocele
    3. Rhinosporidiosis
    4. Neoplasm of sinuses

2. **Extra Ocular Muscle Thickening**
    1. Thyroid
    2. Paracytic cyst

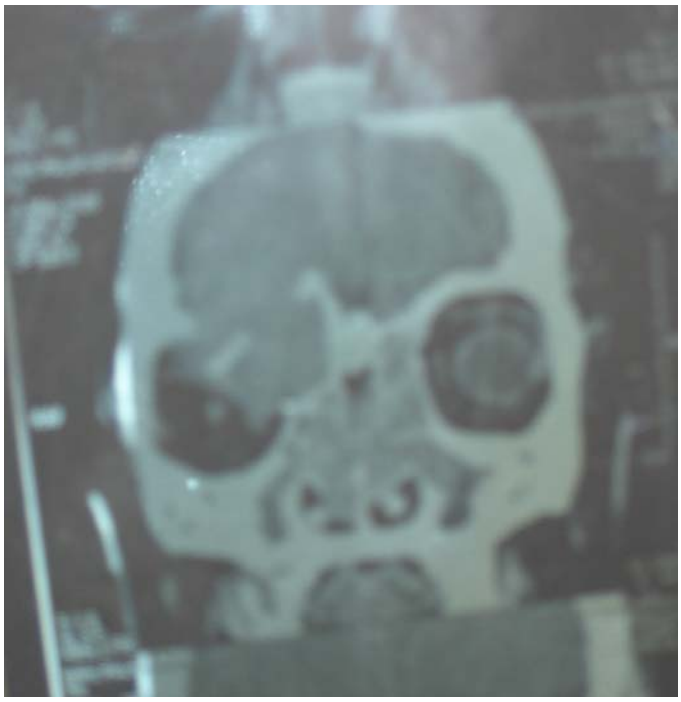
3. **Calcification**
    1. Infection
    2. Parasitic infestations
    3. Neoplasm
    4. Phlebolith

Thus, the plain X ray gives the definitive clues to diagnosis in cases of bony lesions. But, it fails to be as useful in soft tissue lesions.

Ultra SonoGram (B-Scan)

The following echo patterns manifested on B-scan.

1. Orbital Cellulitis – low reflecting soft tissue echoes; diffused mottled appearance of orbital fat.
2. Psuedo tumor – low reflecting echoes; swelling of extra ocular muscles along with tendons and soft tissue enlargements.



CASE NO. 40
CT SCAN – INVERTED PAPILLOMA

CASE NO. 23
CT SCAN – SQUAMOUS CELL CARCINOMA

3. Glioma of optic nerve – Normal “W” shaped retrobulbar echo pattern distorted; compact solid tissue with well demarcated echopattern.
4. Thyroid opthalmopathy – enlargement of extra ocular muscle with out involvement of tendon insertion ; Increase in RB fat shadow.

S.No.	Signs	No. of Cases
1.	Low Reflecting Echoes	2
2.	Enlargement of Extra ocular muscle	2

The USG comes in hand in diagnosing orbital soft tissue lesions. But this does not hold good in case of lesions arising from the bone. On correlation with clinical features it helps us to narrow down the list of differential diagnosis. Thus it is the most versatile test for evaluating orbital soft tissue lesions.

CT Scan

Both axial and coronal CT scan of orbit was taken with the coronal section being more useful in differentiating orbital lesion in relation to optic nerve.

1. Psedo tumor Enlargement of EOM at its attachment to globe
2. Endocrine exophthalmus thickening of OM away from insertion.
3. Optic nerve glioma – fusiform, uniform enlargement of optic nerve.
4. Meningioma – mass lesion along the optic nerve; enlargement of optic foramen in coronal section.
5. Orbitl secondaries – hyper dense diffuse enhanced with contrast discrete and irregular margins, calcification, bony involvement.
6. Carotid carvernous fistula – Superior ophthalmic vein dilated.

CASE NO. 24
FACIAL SWELLING

CASE NO. 46
EWINGS SARCOMA

S.No.	Signs	No. of Cases
1.	Hyperdence diffuse enhanced with contrast	11
2.	Enlargement of EOM at its attachments to Globe	2
3.	Fusiform uniform enlargement of Optic N	1
4.	Hypodense mass in sinuses	2

CT scan holds the key to the diagnosis in case of bony lesions especially secondaries from elsewhere.

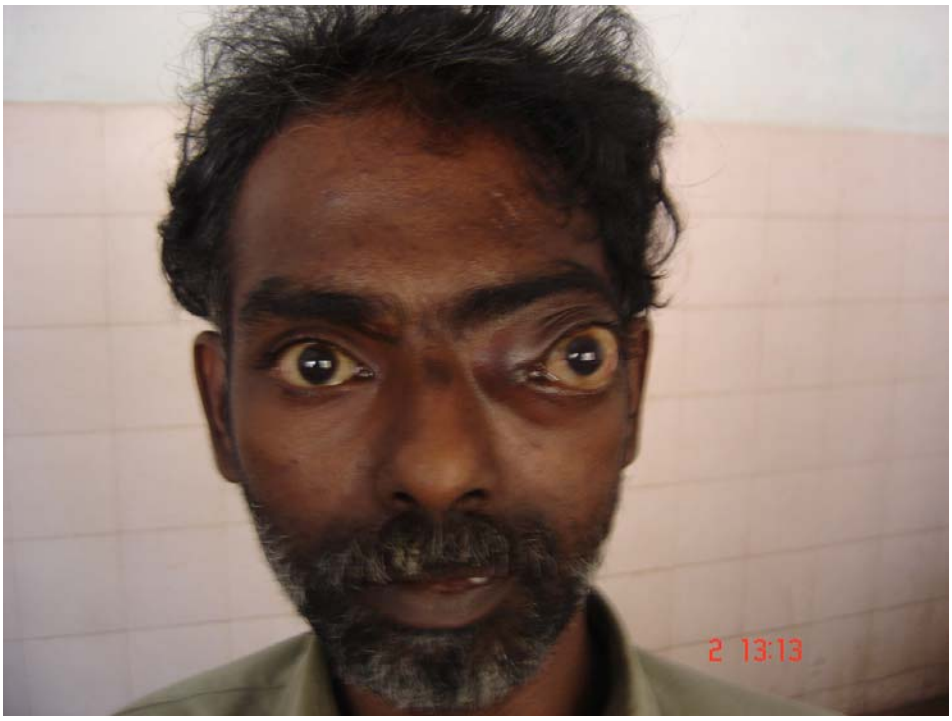
BIOPSY OF ORBITAL TISSUE

Biopsy of orbital tissue was tried only when it would not cause a deleterious effect on the course of the disease or when it is absolutely necessary to arrive at a diagnosis which decides the mode of treatment.

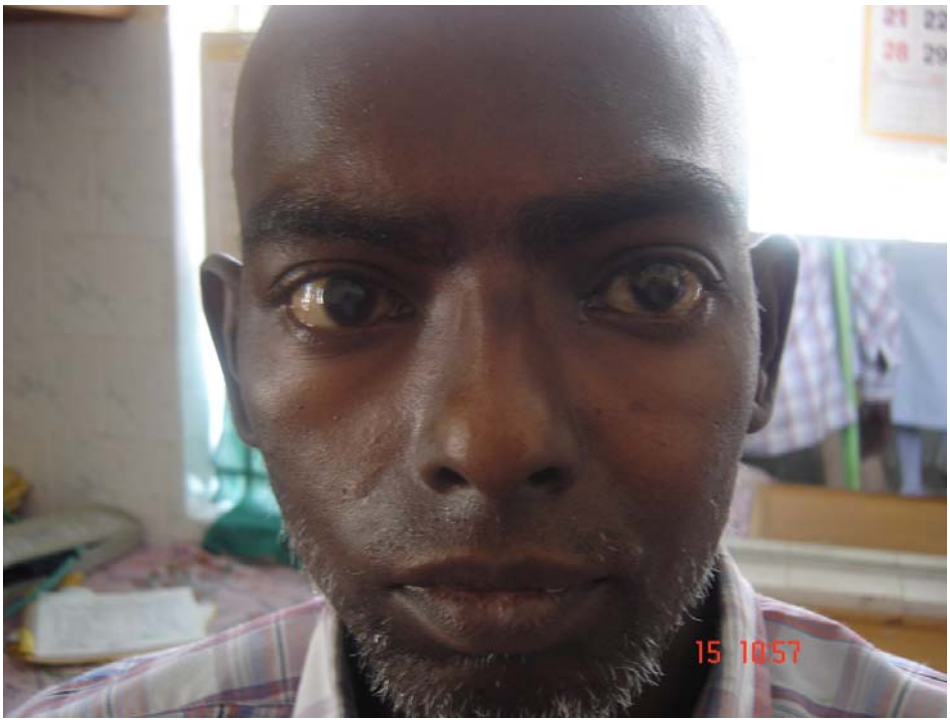
1. Incision Biopsy – Done in cases of tumors that are not easily resectable . Eg : Pseudo tumor

2. Excision Biopsy – Done in cases of localized easily resectable tumors.

All the biopsy reports were supportive to the clinical diagnosis and final diagnosis was made.



CASE NO. 28
BEFORE TREATMENT



CASE NO. 28
AFTER TREATMENT

PROPTOSIS DUE TO E.N.T. CAUSES

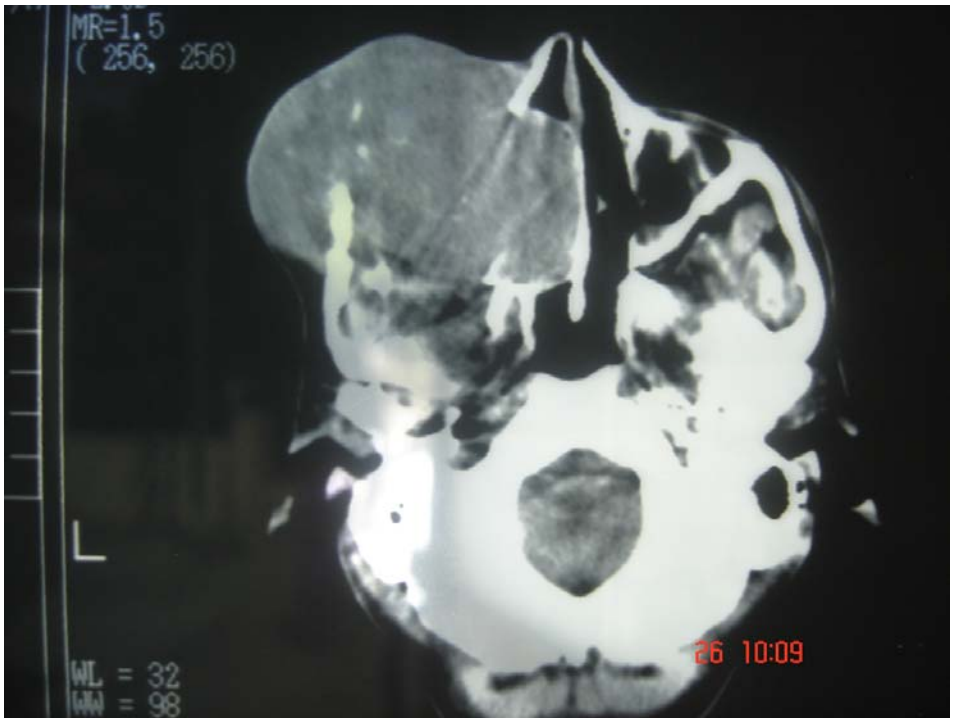
Though Proptosis may seem to be primarily concern of the ophthalmologist, because of the close proximity of the orbit and paranasal sinuses and various connecting fissures and foramina between the two, many E.N.T lesions presenting with proptosis.

Out of 50 cases taken for this study, 21 cases were due to E.N.T pathology. The incidence of different ophthalmic and E.N.T. complaints of the patients is as shown in Table No : 7 below . Besides the obvious complaints of proptosis and associated diplopia and reduced vision and congestion of eyes, E.N.T. complaints included nasal obstruction in 16 cases epistaxis in 9 cases and facial swelling and blood stained discharge in 10 and 3 cases respectively.

PRESENTING SYMPTOM OF PROPTOSIS DUE TO E.N.T. CAUSES.

Table No : 7

Complaint	Cases	Percent
Proptosis	21	100
Nasal Obstruction	16	32
Epistaxis	9	18
Reduced vision	4	8
Facial swelling	10	20
Bloody discahrge	3	6
Redness of eye	4	8
Double vision	4	8



CASE NO. 41
ADAMANTINOMA – CT SCAN

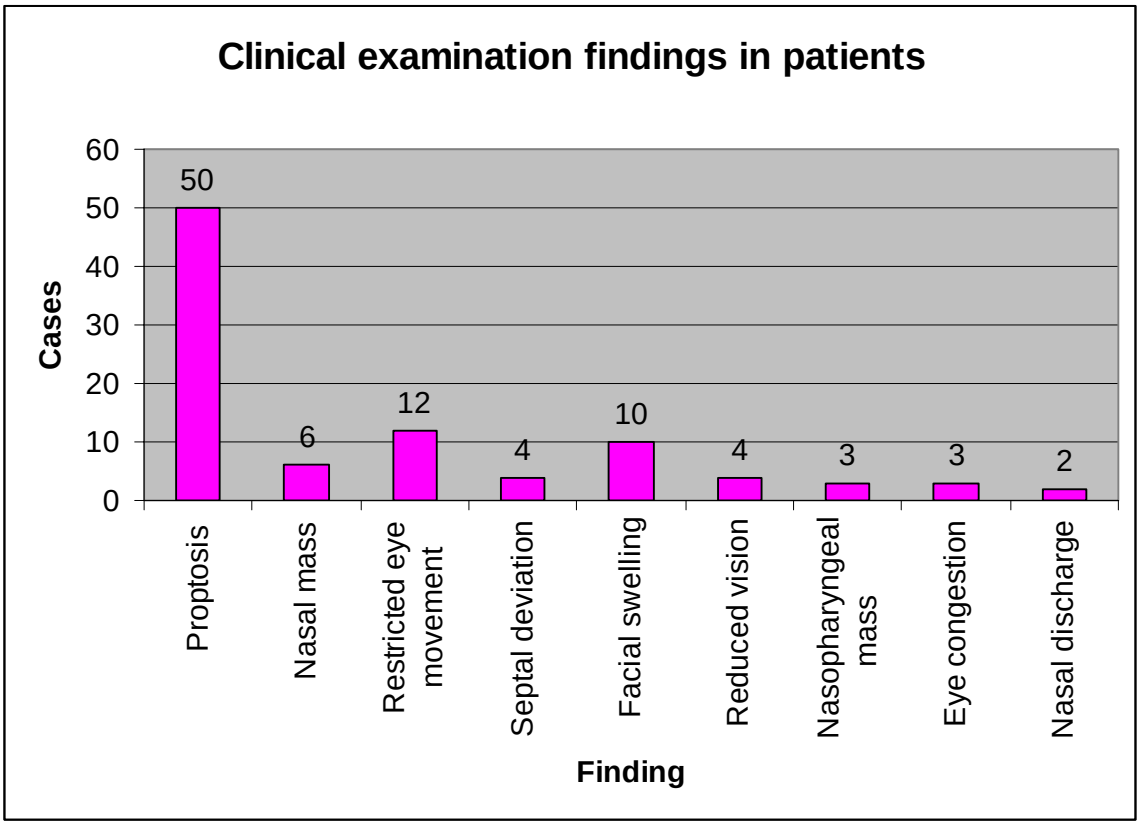
CASE NO. 41
ADAMANTINOMA

CLINICAL EXAMINATION FINDINGS IN PATIENTS

E.N.T examination findings included nasal mass in 6 cases, facial swelling in 10 cases, deviated nasal septrum usually to the side opposite to that of lesion in 4 cases and mass in nasopharynx in 3 cases. The rates of positivity of different investigative modalities employed in the diagnosis of the patients were as shown in Table No :8 .

Table No : 8

Complaint	Cases	Percent
Proptosis	50	100
Nasal mass	6	12
Restricted eye movement	12	24
Septal deviation	4	8
Facial swelling	10	20
Reduced vision	4	8
Nasopharyngeal mass	3	6
Eye congestion	3	6
Nasal discharge	2	4

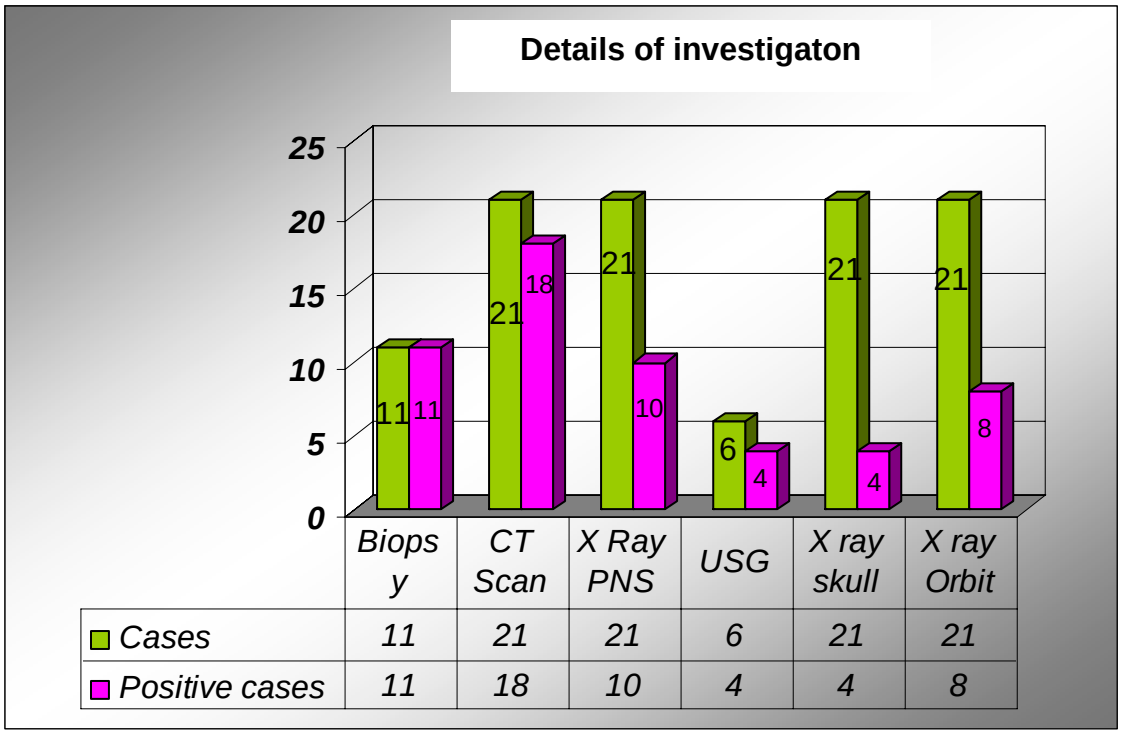


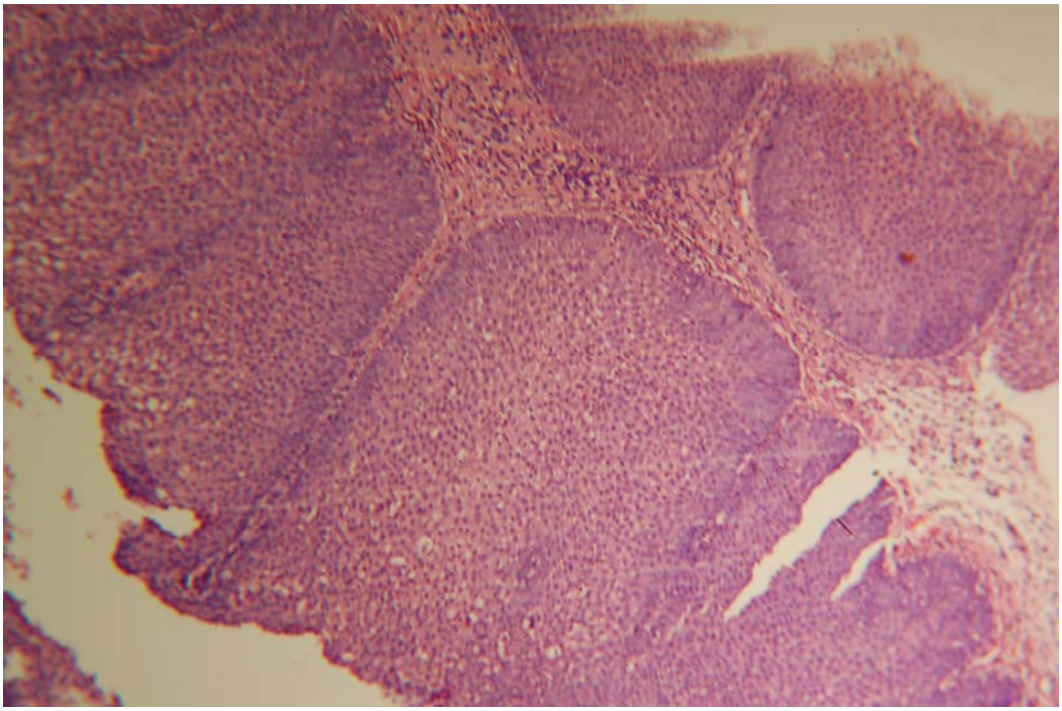
DETAILS OF INVESTIGATIONS

Whereas routine X-rays of skull and PNS showed varied positive results, biopsy of suspicious tissue was taken in 11 cases, all of which gave a positive diagnosis about the nature of lesion. CT scan of PNS and brain was the next most conclusive investigation with about 86% positivity. Ultra sound of the orbit could also give a diagnosis in 67% of the cases thus showing its usefulness as a valuable non-invasive investigation.

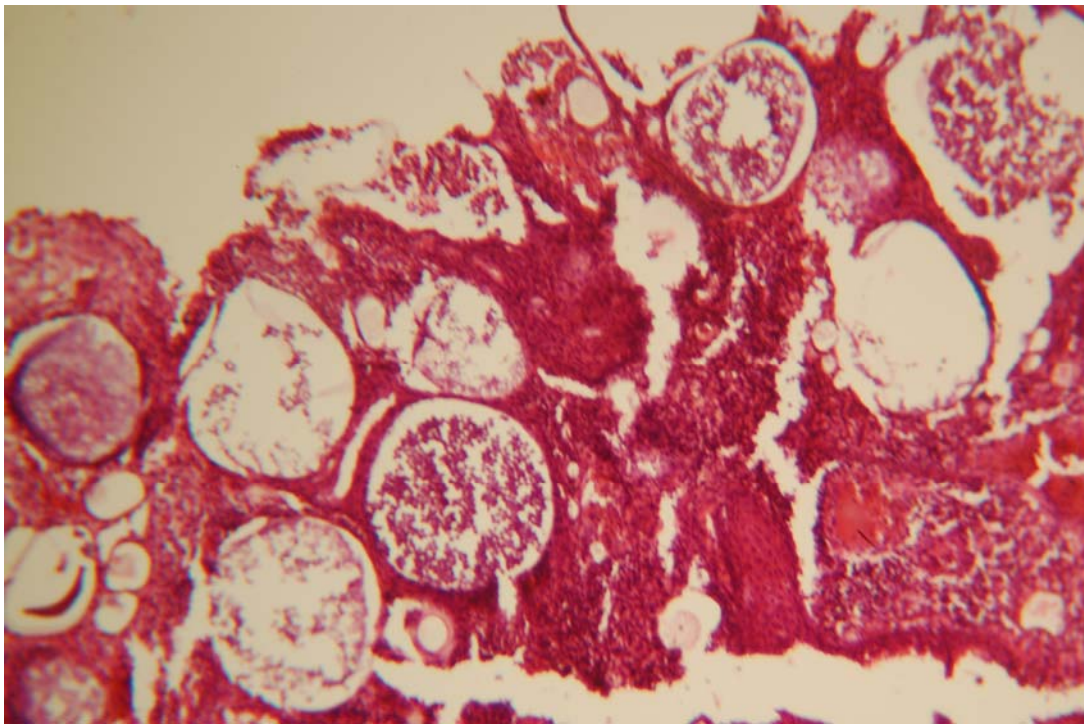
Table No : 8

Complaint	Cases	Positive Cases	Percentage
Biopsy	11	11	100%
CT Scan	21	18	86%
X Ray PNS	21	10	48%
USG	6	4	67%
X ray skull	21	4	19%
X ray Orbit	21	8	38%





Case No. 39 - INVERTED PAPILLOMA



Case No. 25 - RHINOSPORIDOSIS

BIOPSY REPORT :

1. Inverted papilloma – schneiderian type
2. Inverted papilloma – no evidence of malignancy.
3. Squamous cell carcinoma – partially differentiated. (LE nasal cavity)
4. Rt – nasal cavity growth – sarcomatoid CA, high grade.
5. Low grade Lymphoma – NHL involving dermal area of skin.
6. Adenoid cystic CA – Rt ethmoidal sinus.
7. Rhinosporoidosis.
8. Non keratinising squamous cell CA from maxilla – poorly differentiated
9. Adamantinoma.
10. Non keratinising squamous cell CA from maxilla – poorly differentiated
11. mucocele from frontal Sinus.

CT SCAN REPORT

1. Rt maxillary antral growth with RE proptosis.
2. Frontal mucocele with extension into orbital roof.
3. Moderately enhancing right retro bulbar mass involving intra conal area as well as the muscular part – Retrobulbar neoplasm.
4. Extra Conal soft tissue mass with contrast enhancement – Pseudotumor.
5. Hetrogenous contrast mass lesion from left nasal cavty with extension into left orbit, spenoidal sinus with erosion of medial wall of orbit – arising from left nasal cavty.

DETAILS OF DIAGNOSIS

Based on these extensive examinations and investigations, the diagnosis were reached as shown in table below.

Table No : 9

Diagnosis	Cases	Percentage
Ca. Nasopharynx	2	4%
Ca. Maxilla	6	12%
Pansinusitus (fungal)	3	6%
Mucocele	3	6%
Pyocoel	1	2%
Inverted Papilloma	2	4%
Rhinosporodiosis	2	4%
Ca. Spheno ethmoid	1	2%
Adamantinoma	1	2%

DETAILS OF TREATMENT

Modalities of treatment given for the proptosis causes due to ENT Causes were ;

Table No : 10

Diagnosis	Treatment	Result
CA nasopharynx	Surgery + Radiotherapy	Fair
CA Maxilla	Radiotherapy	Fair
Pansinusitis	FESS	good
Mucocele	Surgery	good
Pyocele	Medical + surgical	fair
Inverted Papilloma	Surgery	fair
Rhinosporidosis	Medical	Fair
Ca Sphenoethmoid	RT	Fair
Adamantinoma	Conservative	Poor

ANALYSIS OF TREATMENT

Modalities of treatment employed :

1. Medical
2. Surgical
3. Chemotherapy
4. Radio therapy
5. Observation

Table No : 11

	Medical	Surgical	Chemo	Radio	Total
Thyroid Exopthalmus	3	2			5
Orbital cellulities	4				4
Psuedo tumor	6				6
Pan sinusititus		3			3
Rhino sporidiosis	2				2
Glioma		2			2
Leukaemia	3				3
Maxillary carcinoma and nasopharyngel carcinoma		5	1	8	
Mucocele		3			3
Orbital haematoma	4				4
Inverted Papilloma		2			2
Non Hodgkin's Lymphoma			2		2
Ewing's sarcoma				1	1
Adamantinoma		1			
Pyocele		1			1
Meningoma		1			1

Treatment :

a. Cases of orbital cellulites were treated empirically with broad spectrum antibiotics and if not responding treatment with antibiotics given according to antibiotics sensitivity.
b. Thyroid exophthalmus was treated with beta blockers, oral steroids and hypo thyroid drugs according to thyroid status. Malignant exophthalmus was treated with IV methyl prednisolone followed by oral steroids and the visual prognosis was good.
c. Non Hodgkin's lymphoma and Leukemic infiltrates of orbit were treated with chemo therapy.
d. The two cases of CA nasopharynx that presented with Proptosis were advanced stage of disease and only radio therapy could be given. Surgery combined with radio therapy was decided as the treatment plan for the five cases of CA maxilla. One case was given chemo therapy with radiotherapy.
e. CA spheno-ethmoidal sinus was in close proximity to vital structures and hence was treated with radio therapy only.
f. Inverted Papilloma were treated surgically with Caldwell –Luc surgery.
g. Three cases of Mucocele were treated with surgical decompression.
h. Two cases of rhinosporidiosis was treated with anti fungal drugs and control of diabetesmellitus.
i. Three cases of fungal pansinusites were treated with anti fungal drugs.
j. One case of Adamantinoma was planned with maxillectomy. The follow up could not be completed for this case.

SUMMARY

Fifty patients with Proptosis who attended the Out Patient department of CMCH between June, 2004 – September,2006 were taken up for the study.

The analysis included the various causes, incidence, mode of onset, sex, age of presentation, modalities of investigation and treatment.

1. Of the total 1543 cases with ocular complaints, 50 patients had Proptosis (3.14 %)
2. The incidence of Proptosis in male was 72% and female was 28%
3. The maximum age incidence is more than 40 years (34%)
4. The majority of cases were unilateral Proptosis(76%).
5. 72% presented with eccentric Proptosis.
6. The most common aetiology was neoplasm. (46%)
7. Of the neoplastic causes, E.N.T. causes of Proptois were the maximum.
8. Of the E.N.T causes, CA from maxillary antrum were the commonest. Nasal mass and facial swelling are the commonest finding in these cases.
9. Second commonest cause of Proptosis in the adult population is Pseudo tumor orbit and other inflammatory causes (36%) followed by thyroid ophthalmopathy (10%).
10. The most common presenting complaint to the ophthalmologist is defective vision followed by Diplopia.
11. Majority of cases present with Proptosis followed by Diplopia.
12. Plain X ray is a useful tool in diagnosing bony lesion.
13. USG is the diagnostic tool in soft tissue and cystic lesion on correlation with clinical findings.
14. CT scan is unique in locating intra cranial extension of orbital lesions.
15. With regard to the treatment modalities inflammatory lesions were treated with steroids and antibiotics Mass lesions were managed with surgery, chemotherapy and radiotherapy in collaboration with ENT, neuro surgeon, oncologist and plastic surgeon.

CONCLUSION

- This study brings to light the fact that Propotosis accounts for 3.14% of general ophthalmic cases with a definite male prepondrance.
- Majority of the cases were unilateral and eccentric.
- Based on the data collected, it is arrived at the conclusion that the nasal obstruction and epistaxis are the commonest presenting E.N.T complains in cases of Proptosis of E.N.T origin.
- Nasal mass and facial swelling are the commonest finding in these cases.
- CA Maxilla and CA nasopharynx are the commonest causative lesions. Thus the majority of the lesions are neo plastic in origin.
- The second commonest cause in our hospital is Pseudo tumor orbit with the preponderance of male and unilaterality.
- Of the investigative modalities USG (B scan) played a major role in diagnosis of soft tissue lesions and CT in diagnosis of bony lesion and intra cranial extension.
- Majority of the cases with Proptosis due to E.N.T cause thyroid exophthalmopathy present to the Ophthalmologist first and thus the Ophthalmologist plays a pivotal role in diagnosing and managing these cases in collaboration with ENT surgeon, plastic surgeon, radiologist and neurologist.

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ABBREVIATIONS

A – Axial Proptosis

B/L – Bilateral

BE – Both eyes.

BS – Blood Smear

CFCF – Counting fingers close to face.

CT – Chemotherapy

D – Downwards.

DC- Differential Count.

E- Eccentric Proptosis

EOM – Extra ocular movements.

HM – Hand movements.

HPE – Histopathological examinations.

I – Inferior.

L – Laterally

LE – Left Eye

M – medially

N – Normal

NA – Not acting

NHL- Non Hodgkins Lymphoma

O – Outwards

PL – Perception of Light

PS- Peripheral Smear

PNS – Paranasal Sinuses.

RE – Right Eye.

RAPD – Releative afferent papillary defect.

RT – Radiotheraphy.

TSH – Thyroid Stimulating Hormone

U - Upward

VA – Visual Acuity.

- Absent

+ Present

PROFORMA – PROPTOSIS

Name :

Age :

Sex :

Address :

Complaints :

History of present illness :

H/O Proptosis Age of onset

Onset – sudden / gradual
Duration – acute / chronic
Variability – with cough / posture / valsalva maneuver / sneezing
Unilateral / Bilateral

H/O Defective vision / colour vision / field of vision
H/O Diplopia
H/O Redness / watering / irritation / photophobia. Etc.
H/O Pain nature / severity / aggravating and relieving factor
H/O ENT symptoms (like ear discharge, nasal block, epistaxis, etc.)
H/O Fever / loss of weight
H/O Trauma
H/O Thyroid symptoms (like palpitations, tremor, intolerance to heat and cold, etc.)
H/O Contact with pet animals

Past History

H/O Similar episodes
H/O TB/Syphilis/Malignancy
H/O Thyroid / ENT Problem
H/O Any ocular surgery

Personal History

Vegetarian / Non-Vegetarian

ABBREVIATIONS

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RAPD – Releative afferent papillary defect.

RT – Radiotheraphy.

TSH – Thyroid Stimulating Hormone

U - Upward

VA – Visual Acuity.

- Absent

+ Present

Family History

TB / Thyroid disorder

Treatment History

Medical / Surgical/Chemotherapy/Radioterapy/others

General Examination

Built – well / moderately / ill
Nourishment – well / moderately / ill
Consciousness
Anaemia / Jaundice / Cyanosis / clubbing
Lymphadenoptahy

Vital data

PR / BP / RR / Temp.

Local examination

Head posture
Facial asymmetry

Right eye	**Examination**	**Left Eye**
	Visual acuity	
	Eyelids	
	Eyelashes	
	EOM	
	Conjunctiva	
	Cornea	
	AC	
	Iris	
	Pupil	
	Lens	
	Proptosis	
	Axial / Eccentric	
	Compressibility	
	Retorpulsion	
	Valsalva manuevure	
	Pulsation	
	Orbital margins	
	FDT	
	Fundus	

Tension
Fields
Exophthalmometry
Basal reading
Retinoscopy
SLE

Other consultation

ENT / Neurology / Endocrinology / Radiology / Oncology / Orthopaedics / Paeditrics

Other sytems Examination

CNS/CVS/RS/ENT/ABDOMEN

Provisional Diagnosis

Investigations

Laboratory

TC/DC/ESR/Hb%
Urine – albumin / sugar
Serum T3, T4, TSH
Others
Radilogical
Plain XRay orbit / sinuses / optic foramen skull chest, etc.
A-Scan / B- Scan
USG abdomen / head &neck
MRI / CT Scan orbit / brain / sinuses & plain / contrast)
Orbital venogram

Biopsy:

FNAC / Incisional / Excisional
HPE report
Others

Final diagnosis

Treatment

Medical / surgical / Radiotherapy / Chemptherapy / Others

Follow – up period and advice

Master Chart

S.No	Name	Age	Sex	Onset G/A	Uni/Bilateral	Visual Disturbance	Diplopia	ENT Symptoms	Thyroid Symptoms	Visual acuity	Eye lids	EOM	Conjuctiva	Cornea	AC	Iris	Pupil	Lens	Proptosis A / E	Compressibility	Retropulsion	Valsalva	Pulsations	Orbital margins insinuation	fundus	Fields	Colour vision	Tension mm Hg	Exopthalmometry	SLE	ENT sign	CNS/RS/CVS/Abd/spine and bones	Basic lab	Plain X Ray (orbit/PNS)	A scan / B scan	USG abdomen	MRI / CT	Biopsy	Diagnosis	Treatment
1	Selvi	25	F	G	Bi	Nil	Nil	Nil	Hyper	BE 6/6	lid lag +	Full	N	N	N	N	N	N	A	+	-	-	-	P	N	Full	N	17.3	BE A 3 mm	N	N	N	T3 182.53 ng/dl (70-200) T4 16.42 ng /dl(4.5-12.5) TSH 0.12 ng/dl (0.3 to 5)	N		N	thickenng of extra ocular muscle	-	thyroid exopthalmos	hypo thyroid drugs and observation
2	Saradha	28	F	G	Bi	Nil	Nil	Nil	Hyper	BE 6/6	lid lag +	Full	N	N	N	N	N	N	A	+	-	-	-	P	N	Full	N	17.3	BE A 4 mm	N	N	N	T3 174.25 ng/dl T4 17.02 ng /dl TSH 0.14 ng/dl	N		N	thickenng of extra ocular muscle	-	thyroid exopthalmos	hypo thyroid drugs and observation
3	Malathy	36	F	G	Bi	Nil	Nil	Nil	Hyper	BE 6/6	lid lag +	Full	N	N	N	N	N	N	A	+	-	-	-	P	N	Full	N	17.3	BE A 3 mm	N	N	N	T3 165.32 ng/dl T4 16.54 ng /dl TSH 0.13 ng/dl	N		N	accentuation of retro orbital fat	-	thyroid exopthalmos	hypo thyroid drugs and observation
4	Easwaran	29	M	G	Bi	Nil	Nil	Nil	Hyper	BE 6/6	lid lag +	Full	N	N	N	N	N	N	A	+	-	-	-	P	N	Full	N	17.3	RE A 3 mm	N	N	N	T3 155.78 ng/dl T4 17.34 ng /dl TSH 0.12 ng/dl	N		N	accentuation of retro orbital fat	-	MNG with thyroid exopthalmos	surgery of MNG and hypo thyroid drugs
5	Bakyam	31	F	G	Bi	Nil	Nil	Nil	Hyper	BE 6/6	lid lag +	Full	N	N	N	N	N	N	A	+	-	-	-	P	N	Full	N	17.3	LE A 4 mm	N	N	N	T3 185.87 ng/dl T4 18.14 ng /dl TSH 0.13 ng/dl	N		N	accentuation of retro orbital fat	-	MNG with thyroid exopthalmos	surgery of MNG and hypo thyroid drugs
6	Selvakumar	12	M	A	Uni	Defective vision and pain	Nil	Nil	Nil	RE 6/18	edema + ptosis +	restricted	chemosis	hazy	cells +	N	N	N	E downwards	+	+	-	-	P	No view	Full	N	17.3	BE E 3 mm	N	N	N	N	N	low reflecting echoes; swelling of EOM along the attachment to the eyeball	N	N	-	psuedo tumor orbit	steriods
7	Ramesh	22	M	A	Uni	Defective vision and pain	Nil	Nil	Nil	LE 6/36	edema + ptosis +	restricted	chemosis	hazy	cells +	N	N	N	E outwards	+	+	-	-	P	No view	Full	N	17.3		N	N	N	N	N	swelling of EOM along the attachment to the eyeball	N		-	psuedo tumor orbit	steriods
8	Neela	42	F	A	Uni	Defective vision and pain	Nil	Nil	Nil	RE 6/12	edema + ptosis +	restricted	chemosis	clear	cells +	N	N	N	E downwards	+	+	-	-	P	No view	Full	N	17.3		corneal edema	N	N	N	N	low reflecting echoes; swelling of EOM along the attachment to the eyeball	N	N	-	psuedo tumor orbit	steriods
9	Kala	46	F	A	Uni	Defective vision and pain	Nil	Nil	Nil	RE 6/18	edema + ptosis +	restricted	chemosis	hazy	cells +	N	N	N	E downwards	+	+	-	-	P	No view	Full	N	17.3		corneal edema	N	N	N	N	swelling of EOM along the attachment to the eyeball	N		-		steriods
10	Swamy	22	M	A	Uni	Defective vision and pain	+	Nil	Nil	RE 6/24	edema + ptosis +	restricted	chemosis	N	N	N	N	N	E outwards	+	+	-	-	P	No view	Full	N	17.3		N	N	N	N	N		N	N	-		steriods
11	Kumaran	46	M	A	Uni	Defective vision and pain	Nil	Nil	Nil	RE 6/18	N	restricted	chemosis	N	N	N	N	N	E downwards	+	+	-	-	P	No view	Full	N	17.3		N	N	N	N	N	low reflecting echoes; swelling of EOM along the attachment to the eyeball	N	N	-		steriods
12	Ramasamy	45	M	A	Uni	RE Defective vision and pain	Nil	Nil	Nil	RE 6/24	N	N	chemosis	N	N	N	N	N	A	+	+	-	-	P	No view	Full	N	17.3	RE E 2 mm	N	N	N	N		low reflecting mass lesion	N	increase in soft tissue shadow	-	orbital hematoma	conservative line of treatment
13	Muthu	42	M	A	Uni	pain	Nil	Nil	Nil	RE 6/18	N	N	N	N	N	N	N	N	A	+	+	-	-	P	No view	Full	N	17.3	RE E 3 mm	N	N	N	N		low reflecting mass lesion	N	increase in soft tissue shadow	-	orbital hematoma	conservative line of treatment
14	Chidhambaram	8	M	G	Uni	pain	Nil	Nil	Nil	LE 6/18	N	N	N	N	N	N	N	N	A	+	+	-	-	P	No view	Full	N	17.3	RE E 4 mm	N	N	N	N		low reflecting mass lesion	N	increase in soft tissue shadow	-	orbital hematoma	conservative line of treatment
15	Chithra	7	F	A	Uni	pain	Nil	Nil	Nil	RE 6/18	N	N	N	N	N	N	N	N	EO		+	-	-	P	No view	Full	N	17.3	LE E 3 mm	N	N	N	N		low reflecting mass lesion	N	increase in soft tissue shadow	-	orbital hematoma	conservative line of treatment
16	Saira Banu	12	F	G	Uni	pain	Nil	Nil	Nil	LE 6/6	N	N	N	N	cells +	N	N	N	E	+	+	-	-	P	No view	Full	N	17.3	LE E 3 mm	corneal edema + cells +	dental caries	N	DC-L 60, E 9,N 30, V10 ESR 20 mm/hr		low reflecting soft tissue	N	N	diffused infiltration of lymphocytes,neutrophles with puscels	orbital cellulitis	systemic antobiotics
17	Farooq	14	M	A	Uni	Defective vision and pain	Nil	Nil	Nil	RE 6/6	N	restricted	chemosis	N	cells +	N	N	N	E downwards	+	+	-	-	P	No view	Full	N	17.3	RE E 2 mm	corneal edema + cells +	CSOM	N	DC-L 70, E 9,N 30, V10 ESR 30 mm/hr	haziness of LE maxillary antrum with fluid level	low reflecting soft tissue	N	N	diffused infiltration of lymphocytes,neutrophles with puscels	orbital cellulitis	systemic antobiotics
18	Sivakumar	20	M	A	Uni	Defective vision and pain	Presnt	Nil	Nil	RE 6/60	edema +	restricted	chemosis	sensation abscent	N	N	No reaction	N	E outwards	-	+	-	-	P	No view	Full	N	17.3	RE E 4 mm	N	sinusitis	N	DC-L 50, E 9,N 30, V10 ESR 15 mm/hr		low reflecting soft tissue	N	N	diffused infiltration of lymphocytes,neutrophles with pus cells	orbital cellulitis	systemic antobiotics
19	Murali	8	M	A	Bi	Defective vision and pain	Presnt	Nil	Nil	LE 6/60	edema + ptosis +	restricted	chemosis	N	N	N	N	N	E laterlly	-	+	-	-	P	No view	Full	N	17.3	RE E 2 mm	N	CSOM	N	DC-L 60, E 9,N 30, V10 ESR 20 mm/hr		low reflecting soft tissue	N	N	same	orbital cellulitis	systemic antobiotics
20	Raman	59	M	A	Uni	Defective vision and pain	Presnt	epistaxis, head ache	Nil	RE 6/60 LE 6/24	edema +	all movements restricted	N	N	N	N	reacting	simc	E (D&O)	-	-	-	-	NPMI	No view	Full	N	17.3	RE E 3 mm	N	nasal mass with facial swelling	N	N	radio opaque mass in the right nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lesion in the right nasal cavity		right Ca maxilla	maxillactomy with radiotherapy
21	Kalimuthu	61	M	G	Bi	Defective vision and pain	Presnt	nasal obstruction	Nil	RE 6/60 LE 6/24	edema +	abduction restricted	N	N	N	N	reacting	simc	E (D&O)	-	-	-	-	NPMI	No view	Full	N	17.3	RE E 4 mm	N	nasal obstuction with bloddy discharge and diplopia	N	N	radio opaque mass in the right nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lsion in the right nasal cavity	Squamous cell ca	right Ca maxilla	maxillactomy with radiotherapy

S.No	Name	Age	Sex	Onset G/A	Uni/Bilateral	Visual Disturbance	Diplopia	ENT Symptoms	Thyroid Symptoms	Visual acuity	Eye lids	EOM	Conjuctiva	Cornea	AC	Iris	Pupil	Lens	Proptosis A / E	Compressibility	Retropulsion	Valsalva	Pulsations	Orbital margins insinuation	fundus	Fields	Colour vision	Tension mm Hg	Exopthalmometry	SLE	ENT sign	CNS/RS/CVS/Abd/spine and bones	Basic lab	Plain X Ray (orbit/PNS)	A scan / B scan	USG abdomen	MRI /CT	Biopsy	Diagnosis	Treatment
22	Rajendran	40	M	G	Bi	Defective vision and pain	Presnt	nasal obstruction	Nil	RE 6/60 LE 6/24	edema +	N	congestion	N	N	N	reacting	sim c	E (D&O)	-	-	-	-	NPMI	No view	Full	N	17.3	RE E 4 mm	N	nasal obstuction with bloddy discharge and diplopia	N	N	radio opaque mass in the right nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lesion in the right nasal cavity	Squamous cell ca	right Ca maxilla	maxillactomy with radiotherapy
23	Sahiram	45	M	G	Uni	Nil	Presnt	nasal obstruction	Nil	RE 6/6 LE 6/36	N	N	N	N	N	N	reacting	sim c	E (U&O)	-	-	-	-	NPMI	No view	Full	N	17.3	LE E 2 mm	N	nasal obstuction with bloddy discharge and diplopia	N	N	radio opaque mass in the right nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lesion in the right nasal cavity	Sarcomatoid CA	left Ca maxilla	radiotherapy
24	Abbas	43	M	G	Uni	Defective vision and pain	Presnt	pain in left cheek, epistaxis, head ache, decreased VA	Nil	RE 6/36 LE 6/60	ptosis +	restricted abd, add, dep	N	N	N	N	N	N	E (U&O)	-	-	-	-	NPI	No view	Full	N	17.3	LE E 3 mm	N	nasal obstuction with bloddy discharge and diplopia	N	N	radio opaque mass in the right nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lesion in the right nasal cavity	Squamous cell ca	left Ca maxilla with 3rd, 6th nerve palsy	maxillactomy with chemotherapy
25	Kannamal	52	F	G	Uni	Defective vision and pain	Presnt	pain in RE	Nil	RE 5/60 LE 6/24	ptosis +	restricted abd, add, dep	N	N	N	N	N	N	E (U&O)	-	-	-	-	NPI	RE - nasal discmargin blurd with NPDR	Full	N	17.3	RE E 4mm	N	blood tinged mass with numerous white dots n the surface	7,11, 12 nerve palsy	Blood sugar F 260 PP 320 ketone bodies ++	right maxillary ethmoid sinuses radio opaque	mass with low reflectivity	N	hyper dense mass lesion in the right nasal cavity	rhinosporidosis	rhinosporidosis	control of diabetes with IV Amphotericin-B
26	Kajriammal	50	F	G	Uni	Defective vision and pain	Presnt	pain and swelling in the medial canthus	Nil	RE PL+	N	restricted abd, add, dep	N	edema +	N	N	N	N	E (U&O)	-	-	-	-	NPI	No view	Full	N	17.3	RE E 2 mm	N	nasal obstuction with facial swelling and mucus discharge	N	N	radio opaque mass in the nasal cavity	hyper echoic solid lesion in the right orbit.	N	hyper dense mass lesion in the nasal cavity		Ca maxilla	maxillactomy with radiootherapy
27	Cheniappan	41	M	G	Uni	Defective vision and pain	Presnt	pain in left cheek, epistaxis, head ache, decreased VA	Nil	LE 6/60	N	restricted abd, add, dep	N	N	N	N	N	N	E (U&O)	-	-	-	-	NPI	No view	Full	N	17.3	LE E 3 mm	N	nasal obstuction with facial swelling	N	N	radio opaque mass in the left nasal cavity	hyper echoic solid lesion in the orbit.	N	hyper dense mass lesion in the left nasal cavity	Adienoid cystic carcinoma	left Ca sphenoethmoid	radiotherapy
28	Iyappan	35	M	G	Uni	Defective vision and pain	Presnt	pain in left cheek, epistaxis, head ache, decreased VA	Nil	LE No PL RE 6/60	N	3,7,8,9 nerve palsy	N	sensation abscent	N	N	N	N	E (U&O)	-	-	-	-	NP	No view	Full	N	17.3	LE E 4 mm	N	growth in the nasopharynx	N	N	radio opaque mass in the left nasal cavity	hyper echoic solid lesion in the orbit.	N	hyper dense mass lsion in the left nasal cavity		nasopharyngeal Ca with seconadry orbit	radiotherapy
29	Saraswathi	37	F	G	Uni	Defective vision and pain	Presnt	pain in left cheek, epistaxis, head ache, decreased VA	Nil	LE No PL RE 6/60	N	3,7,8,9 nerve palsy	N	sensation abscent	N	N	N	N	E (U&O)	-	-	-	-	NP	No view	Full	N	17.3	LE E 4 mm	N	growth in the nasopharynx	N	N	radio opaque mass in the left nasal cavity	hyper echoic solid lesion in the orbit.	N	hyper dense mass lsion in the left nasal cavity		nasopharyngeal Ca with seconadry orbit	radiotherapy
30	Veeramani	63	M	G	Uni	Defective vision and pain in RE	Presnt	Nil	Nil	RE 4/60 LE 6/24	edema + ptosis +	restricted	conjestion	sensation abscent	N	N	N	pseudo phakia	E (D&O)	-	-	-	-	NP	No view	Full	N	17.3	RE E 4mm	N	blood tinged mass with numerous white dots on the surface	7,11, 12 nerve palsy	Blood sugar F 280 PP 350 ketone bodies ++	right maxillary ethmoid sinuses radio opaque	mass with low reflectivity	N	hyper dense mass lesion in the right nasal cavity	rhinosporidosis	rhinosporidosis	control of diabetes with IV Amphotericin-B
31	Arumugam	50	M	G	Uni	Nil	Nil	right nasal obstruction with epistaxis	Nil	BE 6/36	edema+	restricted	N	N	N	N	N	N	E (D&L)	-	-	-	-	NPNI	No view	Full	N	17.3	BE E 3 mm	N	severe tenderness of PNS both sides	N	N	water level in maxillary sinus	mass with low reflectivity	N	water level in all PNS	-	fungal pansinusitis	antibiotics and functional endoscpic sinus surgery
32	Muthamal	40	F	G	Uni	Nil	Nil	right nasal obstruction with epistaxis	Nil	BE 6/36	edema+	restricted	N	N	N	N	N	N	BE A	-	-	-	-	NPNI	No view	Full	N	17.3	BE E 3 mm	N	severe tenderness of PNS both sides	N	Blood sugar F 200 PP 270	N	mass with low reflectivity	N	water level in all PNS	-	fungal pansinusitis	antibiotics and functional endoscpic sinus surgery
33	Aanandhan	37	M	G	Uni	Nil	Nil	nasl discharge plus head ache	Nil	BE 6/6	N	Full	N	N	N	N	N	N	BE A	+	+	-	-	NPSM	No view	Full	N	17.3	BE E 4 mm	N	severe tenderness of PNS both sides	N	N	N	mass with low reflectivity	N	water level in all PNS	-	fungal pansinusitis	antibiotics and functional endoscpic sinus surgery
34	Sivarajan	42	M	G	Uni	Nil	Nil	nasal discharge plus head ache	Nil	BE 6/6	N	Full	N	N	N	N	N	N	E downwards	+	+	-	-	NPSM	No view	Full	N	17.3	BE E 4 mm	N	severe tenderness of PNS both sides	N	N	N	mass with low reflectivity	N	water level in all PNS	-	fungal pansinusitis	antibiotics and functional endoscpic sinus surgery
35	Balamurali	43	M	G	Uni	Nil	Nil	nasal obstuction, facial swelling	Nil	BE 6/18	N	Full	N	N	N	N	N	N	E downwards	+	+	-	-	NPSM	No view	Full	N	17.3	LE E 3 mm	N	facial swelling and DNS	N	N	haziness of right ethimoid frontal and sphenoidal sinus	N	N	hypo dense mass in ethimoidal, sphenoidal and frontal sinus extending in to right frontal lobe	-	mucocele	surgical decompression
36	Elizebeth	33	F	G	Uni	Nil	Nil	bloddy discharge and facial swelling	Nil	RE 6/36 LE 6/6	N	restricted	N	N	N	N	N	N	E	-	-	-	-	P	No view	Full	N	17.3	RE E 3 mm	N	facial swelling and DNS	N	N		N	N	hypo dense mass in ethimoidal, sphenoidal and frontal sinus extending in to right frontal lobe	-	mucocele	surgical decompression
37	Suresh	32	M	A	Bi	Nil	Nil	nasal discharge plus head ache	Nil	BE 6/6	N	Full	N	N	N	N	N	N	E (D&O)	-	-	-	-	NPS	No view	Full	N	17.3	RE E 3 mm	N	facial swelling and DNS	N	N		N	N			mucocele	surgical decompression
38	Gabrial	62	M	A	Bi	Nil	Nil	nasal discharge plus head ache	Nil	RE 6/36 LE 6/24	N	Full	N	N	N	N	N	N	E (D&O)	-	-	-	-	NPS	No view	Full	N	17.3	RE E 1 mm	N	nasal obstuction with mass above the upper lid	N	N	haziness of right ethimoid frontal and sphenoidal sinus	N	N	hypo dense mass in ethimoidal, sphenoidal and frontal sinus extending in to right frontal lobe	-	pyocoele	antibiotics and surgical decompression
39	K. Arumugam	64	M	A	Bi	Nil	Nil	Nil	Nil	BE 6/8	N	Full	N	N	N	N	N	N	E (D&O)	-	-	-	-	NPS	No view	Full	N	17.3	RE E 2 mm	N	nasal obstuction with facial swelling	N	N						inverted papiloma	Caldwell Luc surgery
40	Parvathy	42	F	A	Bi	Defective vision	Presnt	Nil	Nil	RE 6/60 LE PL+	edema + ptosis +	BE restricted	N	N	No view	No view	No view	N	E (D&O)	-	-	-	-	NP	No view	Not able to test	N	17.3	RE E 2 mm	N	nasal obstuction with facial swelling	N	N					inverted papiloma Schneidenan	inverted papiloma	Caldwell Luc surgery

S.No	Name	Age	Sex	Onset G/A	Uni/Bilateral	Visual Disturbance	Diplopia	ENT Symptoms	Thyroid Symptoms	Visual acuity	Eye lids	EOM	Conjuctiva	Cornea	AC	Iris	Pupil	Lens	Proptosis A / E	Compressibility	Retropulsion	Valsalva	Pulsations	Orbital margins insinuation	fundus	Fields	Colour vision	Tension mm Hg	Exophthalmometry	SLE	ENT sign	CNS/RS/CVS/Abd/spine and bones	Basic lab	Plain X Ray (orbit/PNS)	A scan / B scan	USG abdomen	MRI /CT	Biopsy	Diagnosis	Treatment
41	Williams	32	M	A	Uni	Defective vision	Nil	Nil	Nil	RE 6/18 LE 6/6	edema + ptosis +	restricted	chemosis	N	N	N	N	N	E (D&O)	+	+	-	-	P	No view	Full	N	17.3	RE E 5 mm	N	nasal obstruction with facial swelling	N	N				growth left axillary sinus	admantinoma	admantinoma maxilla	
42	Elizabeth	35	F	G	Uni	Defective vision	Nil	Nil	Nil	RE 5/60 LE 6/6	N	N	N	N	N	N	RAPD	N	E	-	-	-	-	P	N	Not able to test	Defective	17.3	RE E 2 mm	N	N	N	N	_	_	N			meningioma	surgery
43	Ravi	12	M	G	Uni	Nil	Nil	Nil	Nil	BE 6/18	lid lag +	restricted	chemosis	N	N	N	N	N	A	+	-	-	-	P	roth spots	Full	N	17.3	BE A 2 mm	N	N	N	TC 18000	N	hyper echoic mass in both orbits	N	hyper dense mass lesion in both orbit with bony erosion		CML with leukimic infiltration of orbit	chemotherapy
44	Gopal	34	M	G	Bi	Nil	Nil	Nil	Nil	BE 6/6	lid lag +	N	N	N	N	N	N	N	A	+	-	-	-	P	leukemic	Full	N	17.3	BE A 2 mm	N	N	N	PS and bone marrow	N	_	N	hyper dense mass lesion in both orbit with bony erosion		CML with leukimic infiltration of orbit	chemotherapy
45	Arun	8	M	G	Bi	Nil	Nil	Nil	Nil	BE 6/6	N	N	N	N	N	N	N	N	E	+	-	-	-	P	leukemic	Full	N	17.3	BE E 1 mm	N	N	N	PS and bone marrow	N	_	N	hyper dense mass lesion in both orbit with bony erosion		CML with leukimic infiltration of orbit	chemotherapy
46	Mahesh	10	M	A	Bi	decreased VA	+	Nil	Nil	BE 6/60	edema + ptosis +	resricted	chemosis	exposure keratitis +	N	N	N	N	E downwards	-	-	-	-	NPIS	N	Not able to test	N	17.3	RE E 3 mm LE E 5 mm	exposure keratitis	N	secondary skull + Solid tumour in the upper end of tivia	N	punched out lesion in the skull			N	hyper dense mass lesion in both orbit with bony erosion		Ewing's Sarcoma with seconadry orbit	radiation
42	Veeramani	63	M	A	Uni	Defective vision	Nil	Nil	Nil	RE 6/18 LE 6/6	edema + ptosis +	restricted	chemosis	N	cells +	N	N	N	E (D&O)	+	+	-	-	P	No view	Full	N	17.3	RE E 4 mm	N	N	N	PS Normal			ureteric stones +	irregular thickening of MR and IR	lymphoid infiltrates in the dermal region shows LCA positivity - NHL	NHL	chemotherapy
43	Velusamy	43	M	A	Uni	Defective vision	Nil	Nil	Nil	RE 6/18 LE 6/8	N	restricted	N	N	cells +	N	N	N	E (D&O)	+	+	-	-	P	No view	Full	N	17.3	RE A 2 mm	N	N	N	PS Normal			N	circumscribed soft tissue swelling in the right suprolateral aspect of orbbit	lymphoid infiltrates in the dermal region shows LCA	NHL	chemotherapy
49	Muthukumar	8	M	A	Uni	decreased VA	_	Nil	Nil	RE 6/60	N	Full	N	N	N	N	RAPD	N	A	+	+	-	-	P	papill edema +	_	Defective	17.3	RE A 3 mm	N	N	N	N	N		N	fuciform, uniform enlargement of optic nerve	_	optic nerve glioma	observation
50	Paneer	55	M	A	Uni	decreased VA	_	Nil	Nil	RE 6/61	N	Full	N	N	N	N	RAPD	N	A	+	+	-	-	P	papill edema +	_	Defective	17.3	RE A 2 mm	N	N	N	N	N		N	fuciform, uniform enlargement of optic nerve	_	optic nerve glioma	observation